SCIENCE AND INDUSTRY

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JUL 17 1950
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1920—Thirty Years of Service to Construction—1950

Contractors and Engineers Monthly

Vol. 47, No. 7 JULY, 1950 $3 a Year, 50 Cents a Copy

Covering the Field

• Short-Cuts in Building

Slabs and footings are poured in monoliths to speed a new parts depot for International Harvester. This page.

Ever attended a roof-raising? You can now by turning to page 31 to watch floor and roof slabs cast without forms and jacked up into permanent place.

• Bituminous Paving

Bituminous macadam 3 inches thick paves the New Hampshire Turnpike opened this month. Story starts on page 1.

A contractor highballs his grading machines and double-shifts his crusher for a sub-base and road-mix job—page 43.

• Local Color on Channel Job

The tabloids missed this one, blondes, vandals, and all—not to mention ground water and city congestion. Page 5.

• New Jersey Parkway

Two firsts for New Jersey: the first section of her first parkway paved with concrete, as told on page 10.

• County Tends Parks, Roads

Quite a handful, what with 1,510 miles of roads and 15 parks to maintain. Page 18 tells how it's done.

• Road Maintenance Program

A typical resurfacing job out of 35 on a state's books last year is described on page 22. Contractors supplied materials and machines; department men, the labor.

• RR Trestle Over Floodway

Gantries drive foundation piles and handle reinforcing, forms, and concrete for the high-level crossing—see page 25.

• Australian Airport

A sewer aqueduct and a highway bridge had to be built before this Sydney airport could reach out a bit. Details, page 38.

• Bridge Steel Goes In

Travelers, crawler cranes, and a locomotive crane erect steel for a new Kennebec River crossing in Maine. Page 51.

• Land-Service Roads

There's nothing lone about Lone-Star State rural roads. The Department builds and tends them solicitously—uses them as research labs too. Page 56.

• Aggregate for Canal

"It has to have a high capacity and be easy to move." That's what a canal contractor wanted and got in the way of an aggregate plant. Page 61.

• Sewage Plant

The concrete-delivery pipe on this job travels! A novel swivel joint and carriage are the explanation. Page 65.

• Dam Construction

Page 78 tells of dirt-moving, tunneling, and spillway concreting at Burr Oak Dam, north of Glouster, Ohio.

• Steel-Lined Siphon

A prime contractor and five subs mesh their energies to fabricate, weld, haul, and place steel liners, then pour the concrete for Soap Lake Siphon. Page 82.

(You will find "In This Issue" on page 4.)

C. & E. M. Photo

In a gravel borrow pit off the New Hampshire Turnpike right-of-way, a Northwest 2-yard shovel loads a Heiliner.

New Hampshire Pike Is Built in Fast Time

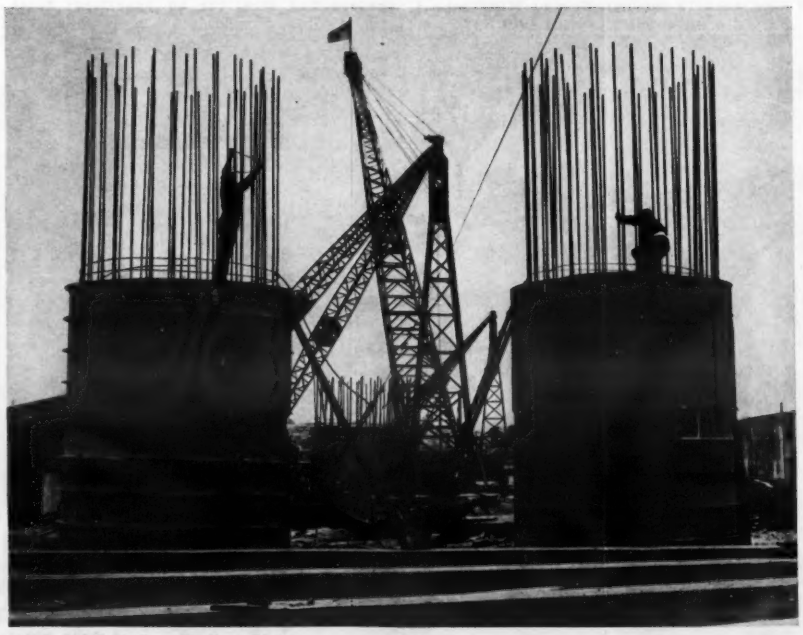
Blessed by a Mild Winter, Contractor Uses Plenty of Equipment to Speed 15-Mile Macadam Expressway

✦ A COMBINATION of good weather, one of the finest arrays of construction equipment in the industry, and energetic contractor know-how enabled the Savin Construction Co. of East Hartford, Conn., to complete the 15-mile New Hampshire Turnpike well before the official opening scheduled for the first of this month. Work on the dual 24-foot macadam expressway that runs along coastal New Hampshire, between the Maine and Massachusetts borders, started in November, 1948, and was practically completed a year later.

The new superhighway will be a toll road like the 48-mile Maine Turnpike to which it connects on the north. Although privately engineered and constructed, the project is sponsored by the New Hampshire State Highway Department. The low-bid Savin contract, which included grading, drainage, paving, and the construction of 17

(Continued on page 90)

SEWER AQUEDUCT AT AUSTRALIAN AIRPORT



Universal Trade Press Syndicate Photo

A pair of caisson piers are sunk for a sewer aqueduct at Kingsford Smith Airport near Sydney, Australia. The airport enlargement—story on page 38—also called for construction of a reinforced-concrete bridge.

New Parts Depot Goes Up in South

Pouring Slabs and Footings Together Speeds Foundation Work and Lowers Costs on Large Warehouse in Atlanta

✦ THE International Harvester Co. is constructing a modern parts depot at East Point, a suburb southwest of Atlanta, Ga. When completed, the large one-story concrete, brick, and steel structure will store vast quantities of equipment parts for better and faster service to Harvester dealers and distributors in the five states Georgia, Florida, Alabama, South Carolina, and Tennessee. Construction began on February 15, and is scheduled for completion within nine months at an estimated cost of $1,500,000. By pouring concrete slabs and footings in monoliths, the contractor eliminated the conventional and slower-to-build footing forms, thereby speeding up the progress of the work and keeping costs down.

The depot is located on an ideal industrial site just outside the city limits of Atlanta. A 26-acre plot was acquired from the Central of Georgia Railroad whose main-line tracks run along the north edge of the property. The site is also well situated to motor and plane transportation lines, with U. S. 19, 29, and 41 passing close by, and the Atlanta Municipal Airport only a few minutes distant. The ample acreage assures plenty of parking space and room for possible future expansion.

Soil conditions are good, with the red sandy clay on the site being virgin ground with no filling-in required. Some light cuts had been made by the Railroad in developing the property. When a backhoe dug trenches 25 feet deep for sewer lines, the ground was firm enough to stand without shoring in the cuts. When wet, however, it is slick and difficult to work on.

Concrete Foundation

The parts depot is a big rectangle measuring 322 feet north and south x 460 feet east and west. Off the east wall at the south end of the building is a 99 x 122-foot wing which is given over to office space. Truck loading from the depot will be handled from a platform along the south end. A spur track of the Central of Georgia Railroad enters the structure at the northwest corner, and runs along the north wall.

Around the entire building is a concrete foundation wall that goes into the ground an average of 4 feet and is 13 inches thick. The concrete walls come up to the first-floor level, which has a finished elevation of 1,010.5. Footings for the exterior columns are built into the wall. Trenches were dug and forms built in them for the wall pours. The 6-inch floor slab was poured right on the ground, and is reinforced with 6 x

(Continued on page 15)

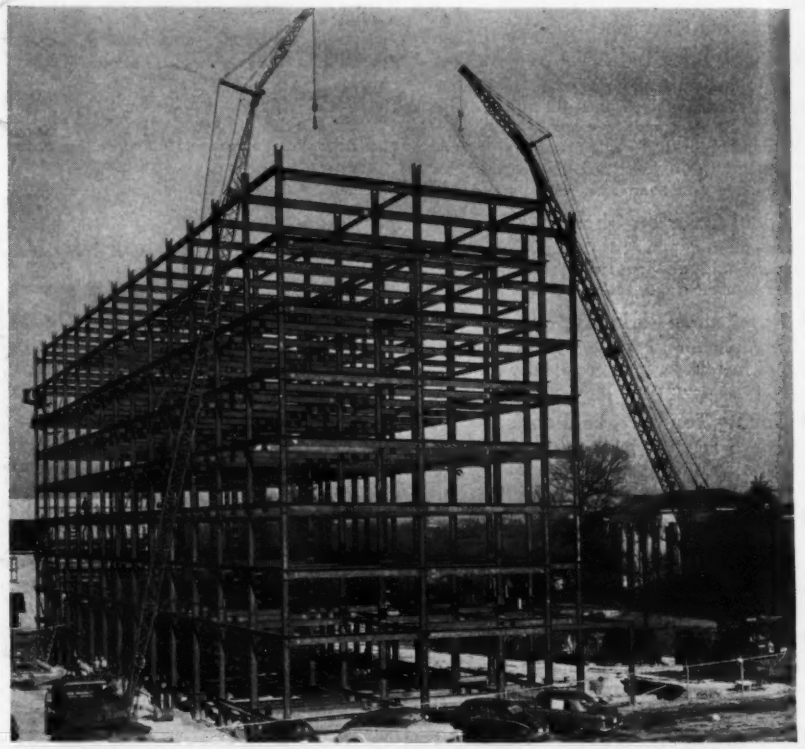
NEWS AND VIEWS

of the construction industry at home and abroad

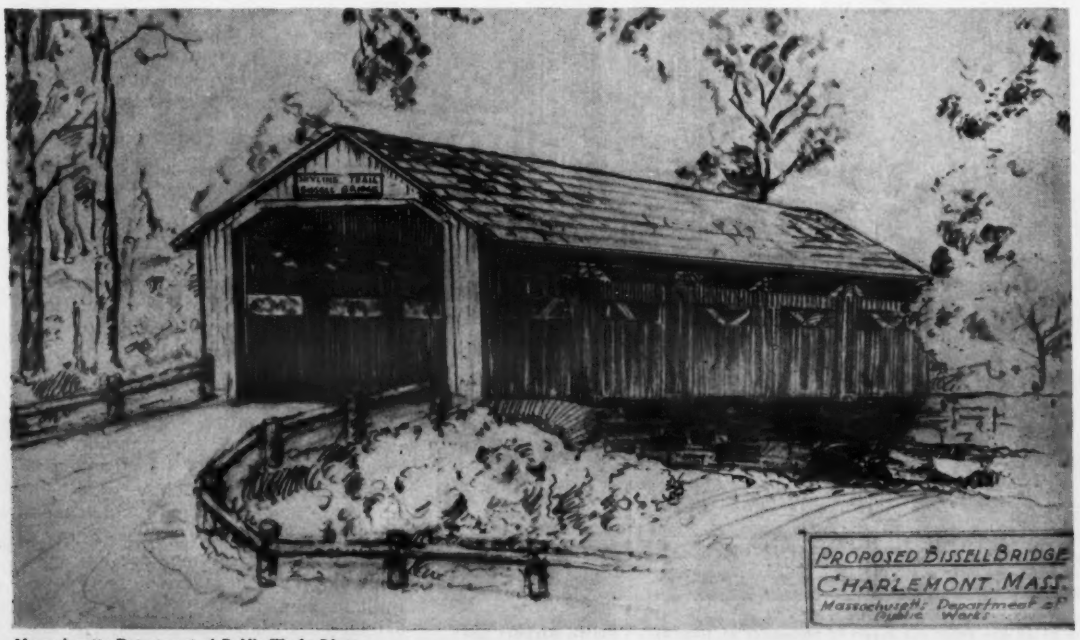
Last month Chicago's Fair of 1950 opened. Here Mayor Kennelly, backed by International Harvester's 100,000th current-model crawler tractor, starts the spade work. I-H President McCaffrey and Fair Manager Kelly look on.

Opened late in May: Washburn Tunnel beneath the Houston Ship Channel at Pasadena, Texas. It's the eighth trench-type tunnel now operating in the U. S. Four of these prefabricated tube sections of steel were towed 400 miles over water and sunk in a trench 90 feet deep x 40 wide in the channel bottom. Consulting engineers, Palmer & Baker, Inc., Mobile, Ala.; tunnel and ramp contractor, Merritt-Chapman & Scott Corp., New York City.

When Canada's Red River spilled over last May, it flooded nearly 500 square miles. Construction equipment starred as dikes went up behind sandbags. Here a Caterpillar DW10 hauls a trailer loaded with sandbags and dike workers through flooded Winnipeg.



Things are "booming" in Greenville, South Carolina. These two Lorain Moto-Cranes are, anyway. Equipped with 105 feet of boom—90 feet plus a 15-foot tip extension—they are erecting steel for an apartment hotel. Daniel Construction Co. is the contractor.



Massachusetts Department of Public Works Photo

A covered bridge to be repaired? restored? replaced? No indeed. Massachusetts proposes to build Bissell Bridge as a crossing for the Skyline Trail at Charlemont. It's not every day we admit our ancestors may have had something.

A cone penetrometer for testing soil hardness is demonstrated at New York University by Dr. A. A. Warlan for Dr. W. Abbott (right), Engineering Advisor to the British Ministry of Education, and Sir Arthur Fleming (center), Research Director of Metropolitan Vickers (England).

A Jobless Man of 45; A DP in Our Society

"The private employers of America are sweeping a serious problem under the bed", said Eric Johnston, President of the Motion Picture Association of America, at a luncheon meeting of the American Trade Association Executives last April in Washington, D. C. This is the problem of the unemployed middle-aged worker.

The middle-aged worker today finds himself in a paradoxical situation: his life expectancy is constantly increasing while his productive life is foreshortened. A layoff slip to a man over 45, says Mr. Johnston, often means a long, if not a permanent, assignment to a "wickedly wasteful human scrap pile". "Too young to retire and too old to find a job—the jobless man of 45 is the Displaced Person in our society today."

The problem of the middle-aged worker, says Mr. Johnston, is an aspect of the problem of large-scale unemployment within a 60,000,000-job economy, but it may be discussed apart from this context. One of the natural resources of a nation is the productive ability of its citizens. If we are concerned about the depletion of our forests and our mines, we should be concerned about the loss of the productive energy of our citizens at a time we used to speak of as "the prime of life".

Pension plans, either Governmental or industrial, represent a negative approach to the problem and are not solutions, according to Mr. Johnston. The possibility of a positive solution now lies with industry, but if industry does not act, the Government will.

As an example of the Congressional attitude, Mr. Johnston quotes a statement Attorney General McGrath made when he was a Senator: "We must end arbitrary idleness for competent middle-aged workers. The problem is real and will grow in importance unless we act promptly. I am confident that unless effective voluntary measures are put into effect and prove their usefulness, the Democratic party will not hesitate to come up with suitable legislation to meet the problem."

Mr. Johnston notes that some individual concerns have tackled the middle-age problem by making it a company policy not to hold an applicant's age against him. And they have discovered that their former accent on youth was a mistake. The mature worker's stability on the job compensates for any possible diminution in his productive capacity.

Mr. Johnston suggested to association members that their first step toward a solution should be to set up study groups within industry to concentrate on the single subject of the jobless middle-aged; to find out actual practices of hiring and firing older workers, and methods of reassigning older workers to lighter tasks; and to collect data on the quantity and quality of work as between youth and age.

The expectation of an industrial solution to the problem, says Mr. Johnston, is not a hope based upon the threat of Government intervention, but upon the new social consciousness of business, which is perhaps "the most distinctive mark of our people's capitalism in America today".

Strike Heads New England Steel Development Corp.

Clifford S. Strike, President of F. H. McGraw & Co., Hartford, Conn., engineering and construction firm, was elected President of the New England Steel Development Corp. at the first meeting of stockholders and directors of the newly organized company. New England Steel is a private development firm whose ultimate goal is the establishment of a steel mill in New England.

The company has appointed Coverdale & Colpitts, a New York engineering firm, to survey the potential markets in the New London, Conn., area and to determine whether or not a steel mill can be built and operated on a sound business basis in that area.

Reclamation Bill Signed

The House and Senate have passed, and President Truman has signed, a bill authorizing flood-control, navigation, and reclamation projects which will cost an estimated $1,730,251,825. The bill carries no appropriations. It simply clears the way for future appropriations by Congress for the projects listed.

These projects are in almost all of the 48 states. Authorizations include $203,723,125 for rivers and harbors; $1,279,870,200 for flood control; $200,000,000 for reclamation in the Missouri River Basin; and $46,658,500 for miscellaneous items, including surveys of possible additional projects.

Toll Road? Mass. Says No

These days it's news when toll-road proposals are rejected. Massachusetts has done just that. A special recess commission of her legislature has rejected a proposal to build a $60,000,000 toll express highway from the Connecticut to the New Hampshire borders. The commission said the project was "economically unsound and financially unwise". It added that it found no public demand for such a project.

Where traffic hits a peak of 60,000 vehicles a day

Resurfacing part of Southern State Parkway, Long Island, N. Y., with resilient, heavy-duty Texaco Asphaltic Concrete

PHOTOGRAPHS

1. Laying the wearing surface of a two-course Texaco Asphaltic Concrete pavement on Southern State Parkway.

2. Note the skid-resistant texture of this Texaco Asphaltic Concrete pavement, which assures maximum safety to motorists.

3. The 1½-inch binder course is shown at the right and 1-inch wearing surface at the left in this photo.

4. The Texaco Asphaltic Concrete on Southern State Parkway was laid by the Standard Bitulithic Company, Baldwin, N. Y.

Southern State Parkway is part of a system of beautifully landscaped parkways, which bring Long Island's fine State parks, bathing beaches and other attractions within easy reach of New York City. During the summer, Sunday and holiday traffic on Southern State Parkway reaches 60,000 vehicles in 24 hours, with a high of 40,000 cars a day on weekdays.

Last fall a 2½-mile section of Southern State Parkway, beginning at the New York City line, was resurfaced with a two-course Texaco Asphaltic Concrete pavement, consisting of 1½-inch binder course and 1-inch wearing surface. Its construction on an important part of this popular parkway helps explain why hot-mix, hot-laid asphaltic concrete paving has been chosen in the past by road builders throughout the country to serve exceptionally heavy traffic.

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TEXACO ASPHALT

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A Bigger ARBA

The American Road Builders' Association, a national promotional group, is actively endeavoring to increase its membership so as to include all those who approve its aim of "more and better highways". Offhand one might say that everybody is for additional and improved roads, but in a country as large as ours, the voice of the individual, if raised for this purpose, is like one crying in the wilderness. But where individual voices pass unnoticed, a collective voice makes itself heard, demanding and receiving attention.

Many state good-roads associations are doing fine work throughout the country in promoting highway construction and improvement within the states where they are organized. The ARBA is the only group promoting this idea and this idea alone on the national level. It now draws support from a goodly number of individuals and organizations, principally from public highway officials—state, county, and municipal; some contractors; manufacturers and distributors of road construction equipment; a smattering of consulting engineers; and college professors who teach highway engineering subjects.

This present membership barely scratches the surface of those who should be, and no doubt are, road-conscious, but who, for various reasons, have shunned active participation in advancing the cause of more and better roads. ARBA is seeking to round up all these elements, and fuse them into one articulate group where their combined efforts can do the most good. It is aiming at motor car and tire manufacturers, oil companies, steel producers, and material suppliers including asphalt and cement interests. Cooperation or affiliation is also desired with such groups and organizations as truck and bus interests, Associated General Contractors, automobile clubs, insurance companies, American Association of State Highway Officials, National Highway Users Conference, U. S. Chamber of Commerce, Automotive Safety Foundation, and others.

The above list should insure representation of practically everybody who wants to see the road needs of this country realized. In unity there is strength. If ARBA succeeds in getting these various groups together—and there seems to be no reason why it should not—its worthwhile objective of more and better roads must surely be achieved.

Safety Goals Still Distant For Construction Industry

The construction industry still has a long way to go—toward safety. The National Safety Council reports that American workers in industry as a whole were a lot safer in 1949, but workers in the construction industry weren't much better off than they have been in the past.

Out of 40 basic industry classifications, 38 reduced their accident frequency rates and 28 reduced their severity rates. (Frequency rates are based on the number of disabling injuries per 1,000,000 man-hours; severity rates, on the number of days lost per 1,000 man-hours.) The frequency rate for all industries reporting was 10.14 in 1949—a reduction of 12 per cent from 1948; the severity rate was 1.02, a reduction of 9 per cent from 1948.

As for the construction industry, its frequency rate was 19.48 and its severity rate was 2.15. Those figures represent a 16 per cent reduction in accident severity from 1948, but no reduction in accident frequency. In the list of 40 industries, construction ranks 34th in accident frequency and 33rd in accident severity. Apparently there's room for improvement.

Bridges Are Architecture

If you've ever wanted to see and judge for yourself the work of the world's great bridge builders, you can do it now, effortlessly. In her book "The Architecture of Bridges" published by the Museum of Modern Art, Elizabeth B. Mock leads you across continents and through time, picturing bridges, analyzing them, and evaluating them as architecture.

With 170 magnificent photos she traces the development of bridges—stone, wood, metal, and reinforced concrete—showing how each material suggests its own characteristics and effective treatment . . . how stone builders lightened and articulated the massive Roman arch . . . how other builders dealt with wood as vines, as sticks, and now as laminated molded plywood . . . how nineteenth and twentieth-century engineers asserted the special character of iron and steel in attenuated cables, filigreed arches, and latticed trusses . . . how today they are challenged by the continuity of structure and surface that is possible in welded steel . . . how the classic nature of reinforced concrete was revealed in the bridges of the Swiss genius Robert Maillart.

The author dedicates her book to the proposal common 200 years ago, but radical today, that *bridges are architecture*. Her whole concern is with the art of structure as developed by the bridge engineer or architect in response to the challenge of new materials, new techniques, new problems.

The unity of that art was broken during the eighteenth century, she points out, when engineering became a separate and highly specialized profession. But while the architect's designs tended to deteriorate into mere decoration, the engineer, unhampered by historical precedent, was free to find appropriate expression for new materials and create new aesthetic values. The best of his work was therefore more truly architecture than was the nostalgic re-creation of the architect.

Unfortunately, the twentieth-century engineer, perhaps contemptuous of art, has tended to satisfy himself with mere expediency. As contemporary architects are assimilating the lessons of nineteenth-century engineering, contemporary engineers, Miss Mock suggests, might well study the principles of twentieth-century architecture.

Seldom have pictures, history, and aesthetics been more splendidly combined than in this book offered by the Museum of Modern Art, 11 W. 53rd St., New York 19, N. Y., for $5.00. Author Mock was formerly Curator of Architecture at the Museum and is now a member of the faculty of the School of Architecture, University of Oklahoma.

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Bureau Maillart Photo
Robert Maillart's first masterpiece, in his quest for an integrated structure using the "wonderful new material" concrete, was the Tavanasa Bridge over the Rhine in Canton Grisons, Switzerland. It was destroyed by landslide in 1927.

Philip D. Gendreau Photo
"One of the most satisfactory of many handsome medieval English bridges", says author Elizabeth B. Mock in her book "Bridges Are Architecture". It is Newby Bridge in Lancashire, near Lake Windermere, England.

Port of New York Authority Photo
Bayonne Bridge over the Kill van Kull, New York and New Jersey, has a two-hinged arch of 1,652 feet. "The arch is magnificent", says author Mock, "worthy of its fame as the longest in the world." The bridge was built in 1931.

Blondes and Vandals Enliven Channel Job

High Ground-Water Table And Congestion Are Other Job Nuisances as Flood Channel Is Built in City

✦ THE average blonde in the glittering little town of Hollywood, Calif., is supposed to be more interesting than the average construction project. In nearby North Hollywood, only a few miles distant, are men who disagree. Both, they say, can be difficult.

If pursued to the ultimate, that tangent could be interesting, but the men in North Hollywood hasten to spike any inferences. Blondes cause trouble in more prosaic ways, they assure you.

Their convertibles jam traffic around the job in the late afternoon, and delay aggregate trucks. To add to the excitement, children take pleasure in cracking exposed tiles and wrecking pumps. Such nuisances, added to the routine headaches of ground water and congestion on a new concrete river channel, make good-natured construction stiffs want to commit mayhem.

By February 15, 1950, however, the battle was over, and a new concrete channel was finished to carry the flash floods in Big Tujunga Wash. The work was one part of the comprehensive flood-protection scheme for the Los Angeles area, which has been under construction for the past 15 years. The contract for this project was held by the firm of A. Teichert & Son, Inc., of Sacramento, Calif., and the project was under supervision of the Los Angeles District of the Corps of Engineers.

Good Progress on Channels

Excellent progress has been made since work was accelerated in 1935. The problem was unique. Millions of people lived on a flood plain between the mountains and the sea. A few stream beds, normally dry, meandered across the land. During the rainy season they leaped up like unchained beasts, ruining everything which interfered in their path to the sea. People insisted on encroaching on these danger areas despite all warning.

The flood-control plan was rather simple, therefore. Reservoirs were built in or near the foot of the mountains to stop the water temporarily, and to trap boulders and sand. Concrete channels were then begun, to carry water from the reservoirs to the sea.

Extensive work on the Los Angeles River, both by contract and force account, has now finished the channel from Stewart and Gray Road to Tujunga Wash, a distance of 24 miles through the heart of Los Angeles. Teichert's contract, calling for 10,300 feet of completed channel, is the first section of what will eventually be a hydraulic raceway 9 miles long between Hansen Dam and the Los Angeles River. Tujunga Wash drains 147 square miles of the San Gabriel Mountains. During the flood of 1938, it poured 54,000 cfs across the flat, exposed San Fernando Valley.

From the upper limit of the Teichert job there are approximately 7 miles of Tujunga Wash channel to be improved. A contract for improvement of 11,200 linear feet of this length immediately above the Teichert job has been awarded recently to Bressi & Bevanda Constructors, Inc. When the entire channel has been improved, operation of the 33,000-acre-foot Hansen Reservoir will permit the 30,000-cfs section of channel which Teichert built to carry discharge water successfully, even if such a storm as that of 1938 should occur in the future.

The channel is 70 feet wide, with 14-foot walls and a 10-inch steel-reinforced slab. Wall footings are from 12 to 18 inches thick. The walls taper from a 15-inch base to a top width of 12 inches. The invert slab rests on 6 inches of sand and 6 inches of crushed-rock cushion material. Perforated clay pipe from 8 to 15 inches in diameter drains the base and helps to carry off subsurface water in summer when the stream is low.

Four intersecting bridges were constructed under the Teichert contract, and three concrete-encased sewer siphons were placed under the channel at least 12 feet below ground water. According to many of the men who remember that phase, it was the most difficult part of the job. The trenches had to be roughed out first by dragline, and then unwatered by pumps as machine excavation continued. Sand oozed in to slow the work. Sandbags and dumped rock were necessary to stabilize the caving banks. Fine-grading, like excavation through bridge-pier foundation piling, had to be done by hand.

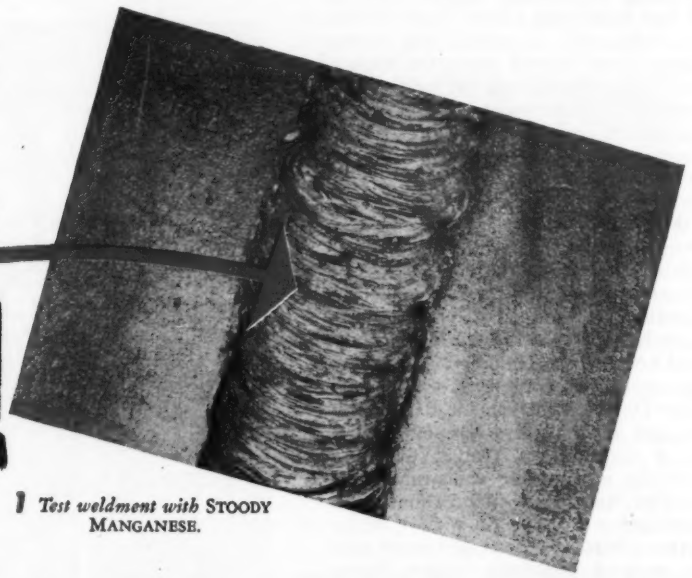
C. & E. M. Photo
The Tujunga Wash Channel from the top of the wall—a concrete crew places the invert slab. In the background is a section of completed channel.

Channel Excavation

Three traffic detours, with temporary bridges, were constructed ahead of channel excavation work. When these

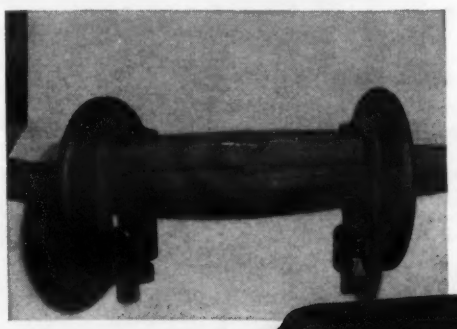
(*Continued on next page*)

LOOK no cracks!



1 *Test weldment with* STOODY MANGANESE.

2 *Manganese plates beveled and ready to weld.*



3 *Warpage is counteracted with husky "C" clamps.*

4 *This finished test piece has been deformed in a press, placing* STOODY MANGANESE *weldment under severe tension. Note degree of distortion sustained before crack develops.*

A simple test that proves Superiority of STOODY MANGANESE!

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Bevel two ¾" manganese plates for vee-groove welding. Shim under the beveled edges to produce a slight reverse bow, such as would normally be allowed for contraction.

Now restrain the ends with husky "C" clamps and fill the vee with STOODY MANGANESE. Since the test pieces cannot move, the contraction strain is obviously placed on the weldment itself. NOTE THE COMPLETE ABSENCE OF CRACKS! Try this with any other bare manganese and compare results.

WHAT THE TEST PROVES: Absence of cracking indicates unusually high ductility, a quality in STOODY MANGANESE which insures extra strength... keeps welded parts WELDED where unusual shock and impact are encountered.

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Blondes and Vandals Enliven Channel Job

(*Continued from preceding page*)

detours and structures were finished, and traffic began to flow through and around the project, machines were brought in to push the channel excavation to completion as rapidly as possible.

Fortunately, most of the channel excavation consisted of sand and silt. No blasting was necessary. Of a total of 852,000 cubic yards of excavation, about 600,000 was stockpiled for backfill along the channel. The remainder was hauled to the south end of the project, stockpiled, and used for backfill along the recently completed Los Angeles River channel.

The ground-water table lay above the bottom grade of the channel. It was therefore necessary to conduct the excavation in some way to eliminate this aggravation as much as possible. Excavation began at the downstream end of the project, and a Lima 1201 dragline, swinging a 3¾-yard bucket from its 80-foot boom, dug a deep channel along the right bank. A part of this narrow channel was located along the edge of the right-wall footing of future construction. Water seeped to this drainage trench, and flowed on down to the completed channel below. An 80-D Northwest dragline, with a 2½-yard bucket on a 70-foot boom, also helped.

When the drainage trench was in, work began on the main block of excavation. The two draglines loaded six 20-yard custom dump trucks, owned by Camillo Bros., and six 13-yard bottom-dump Euclids owned by Teichert. Huge blocks of dirt were handled by a tractor equipment fleet consisting of 10 Caterpillar D8's, 4 LeTourneau RU Carryalls, and 2 Wooldridge scrapers. Later on, 4 Caterpillar DW10's with LP Carryalls made their appearance, but these machines were used primarily for backfilling.

About 80,000 yards of dirt were used for embankment fills under future streets, and there were also some miscellaneous fills. The smooth flow of traffic over the new flood channel was one of the important design elements.

In extremely wet places, the last few feet of earth had to be loaded out by the draglines because it was too soft for tractor equipment. The entire excavation job was complicated by lack of room and the nearness of machines to an inhabited community. In places, the property lines of homes lay adjacent to the channel right-of-way. Every cubic yard of dirt on that kind of undertaking had to be considered carefully, in order to make everything balance and still leave a spot for the dirt to be placed.

Drains a Necessary Nuisance

Construction of a trench, with gravel backfill and perforated clay pipe, was a necessary nuisance. Necessary because the plans showed it laid longitudinally down the center of the channel. A nuisance because the muck was sopping wet, hard to dig, hard to hold, and hard to work in. This trench was roughed out by the dragline as it picked up the last few feet of excavation, but extensive fine-grading was also necessary.

Arrangements were finally concluded with Gladding, McBean & Co. to produce the perforated clay pipe. The crushed rock was trucked in by Graham Bros. from its commercial pit in the San Gabriel Valley. The aggregate was placed by truck when possible, and craned in otherwise.

The first instances of vandalism began to manifest themselves as soon as the pipe arrived. After a while it began to look like Halloween on a permanent basis.

"We had to keep everything closed up from day to day," explained the drain foreman. "The little devils would take dowel bars and pry down through the tile holes, cracking every piece in sight. They'd take heavy steel nuts off the form bolts to throw at those they couldn't reach. It was terrible. We just had to keep the rock coming in every day, and cover up everything we placed as soon as we put it in."

Construction of two sewer siphons, too, posed a serious problem in this regard. At one time five Jaeger pumps were running day and night: an 8-inch, two 6-inch, and two 4-inch machines. The water they removed was sent over to the low-water channel dug as a pilot cut. While this work was under way, especially, everybody kept one eye on the little hooligans on top of the bank.

"I won't say those kids were mean," grinned one weatherbeaten old construction stiff. "But Red Skelton's Mean Little Kid was an angel by comparison!"

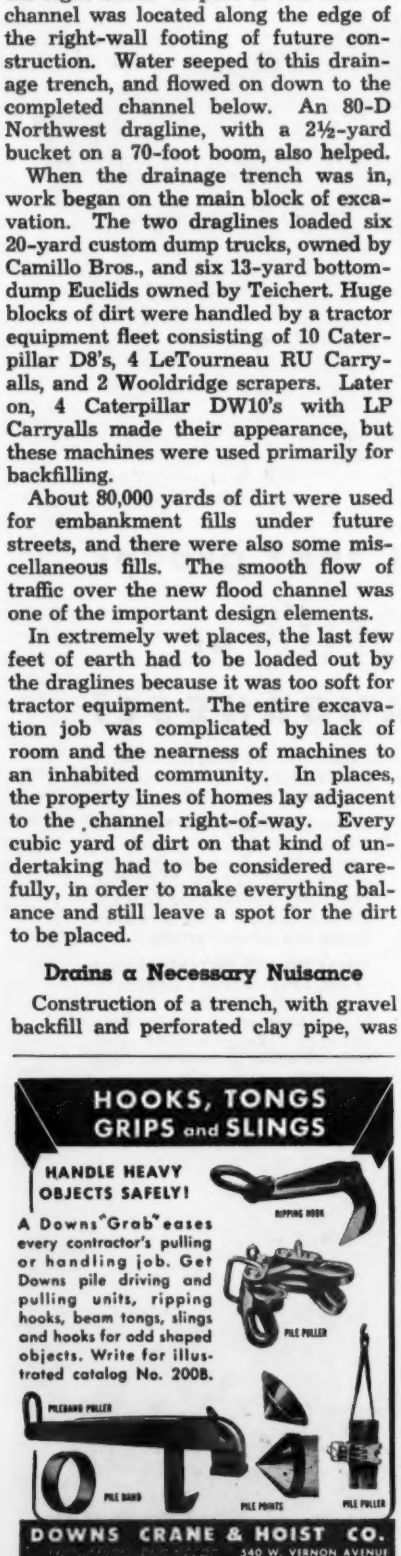
Special Wall Forms Used

Use of special steel wall forms produced the most perfect curves yet built on Los Angeles County flood-control work. Many of the curves were so sharp that the usual 50-foot panels, which had been used in the past, were viewed with misgiving by officials of the Corps of Engineers, in the belief that the chords they produced would interfere with the hydraulic properties of the channel.

Nine sets of special lightweight steel forms, in panels 6½ feet long made up together to aggregate 52 feet, were used. They were built to Teichert's design by Pioneer Blacksmith & Welding Co. of Los Angeles.

Each form consisted of a ⅜-inch skin plate, faced with vertical lumber sheathing. The skin plate was fastened onto 6-inch 8.2-pound channel steel studs, five to each 6½-foot form. Maximum spacing on these studs was 1 foot 8½ inches. Five ⅜ x 6-inch brace plates were welded to the studs on one type of forms, but for the most part, the studs were braced direct by two sets of steel wales. Special steel form bolts, tapered to permit their easy re-

(*Continued on next page*)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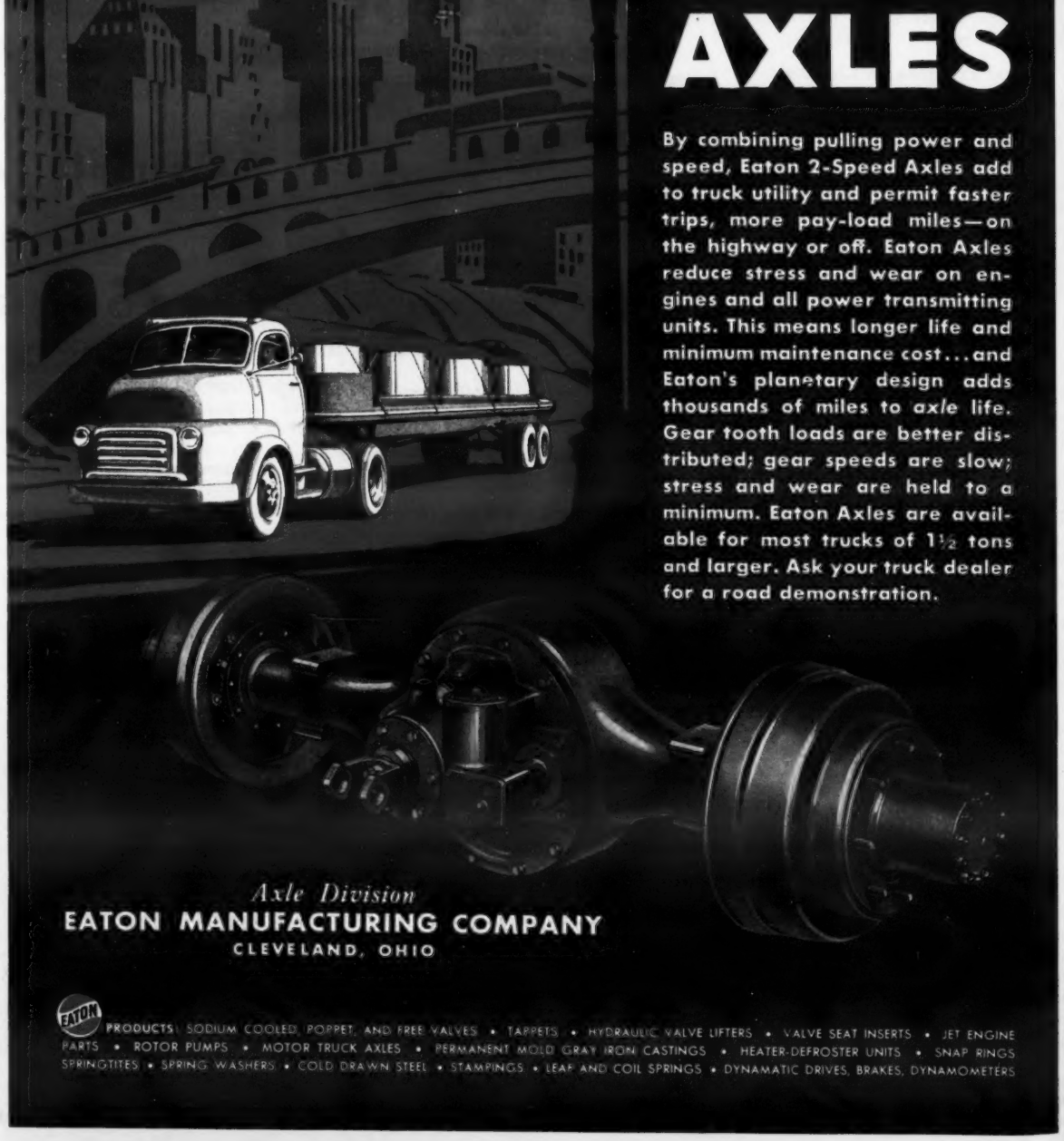
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moval, were used to hold the forms together. Since the panels were arranged in 52-foot pours, the individual sections could be shaped almost exactly to fit the curves.

Only nine 52-foot sets of these forms were on the project, yet there were many days which saw 8 pours made. Forty wall panels a week was not uncommon. The forms were moved in 50 minutes by a crew of 6 riggers, 3 carpenters, and 7 laborers. The 52-foot panels, fully assembled, could be handled easily by a Link-Belt truck crane of 20-ton capacity.

Wall pours were made by hauling dry batches in from a central batching plant, and dumping them to the skip of a MultiFoote 34-E paver. The finished concrete was discharged to a 1½-yard Gar-Bro transfer bucket, and hoisted to the top of the walls by a 1½-yard P&H crane. All vibration was done internally by Viber electric machines. Engineers believed that the use of vertical sheathing made the vibration exceedingly effective, since it gave air bubbles a chance to escape.

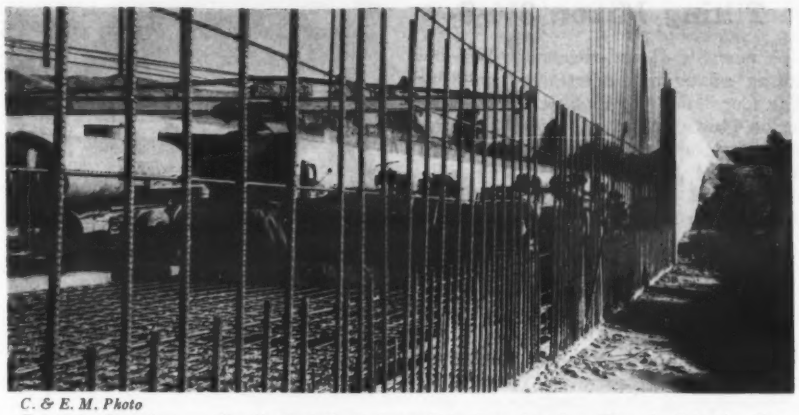
After approximately five uses, the lumber facing on each form was sanded smooth, and any necessary repairs were made. A form process oil made by Richfield Oil Co. was used on each form just before it was set up. The forms were stripped and moved ahead after the concrete had been in place at least 24 hours.

Highway paving equipment was used to place the invert slabs. Crews working just ahead of paving placed the granular material called for under the invert. Sand came from a local pit about 3 miles away, while rock was supplied by the Blue Diamond Corp. from a commercial pit. Both materials were trucked in, spread by bulldozer, and graded smooth by a Caterpillar motor grader.

A single layer of ⅝-inch steel reinforcing was also laid ahead of paving. The bars, spaced at 12-inch centers both ways, were supported on concrete blocks spaced as required.

Invert monoliths were 100 feet long x 22 feet wide. A 1-inch expansion joint at each end of the invert monoliths consisted of mastic material and 1 x 36-inch steel dowel bars at 12-inch centers. They were capped at the transfer end by copper cans, or sleeves.

The batches of concrete were mixed by a Rex 34-E dual-drum paver, and dumped direct to the pour. As a rule the center strip was poured first, and



C. & E. M. Photo

Concrete-dumping on the flood-control channel in Los Angeles. The steel is for the channel walls. A. Teichert & Son, Inc., of Sacramento, had the contract.

it was then used as a working base toline.
pour the two adjoining lanes. The The Blaw-Knox spreader was folfreshly dumped concrete was spreadlowed in turn by a Jaeger finishing mabetween the steel forms by a Blaw-chine, which carried a Jackson surface Knox spreader, which also carried twovibrator near the front end. After it large Viber electric vibrators behind tohad passed, finishers with wooden floats vibrate the concrete along the formput on the final finish, which did not have to be trowel-smooth as in former days. The concrete for invert slabs and walls was all cured with Hunt Process Clear solution.

The batch plant was a Blaw-Knox 300-ton aggregate 1,100-barrel affair, set up near the center of the project at Riverside Drive and Whitsett Avenue. Riverside bulk cement was used, with three sizes of rock and sand furnished by Graham Bros. Specifications originally demanded 1½-inch maximum-size aggregate, but the mix was changed to include some 3-inch rock in invert slabs, wall footings, and bridge abutments. An air-entraining agent was used for a short time, but was discontinued.

Personnel

The Tujunga Wash channel was designed and administered under the general direction of Colonel W. D. Luplow, District Engineer. J. G. Morgan was Resident Engineer until November 10, 1949, at which time he was relieved by

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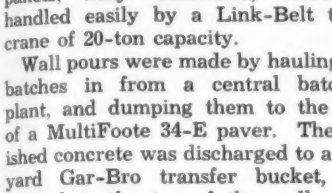

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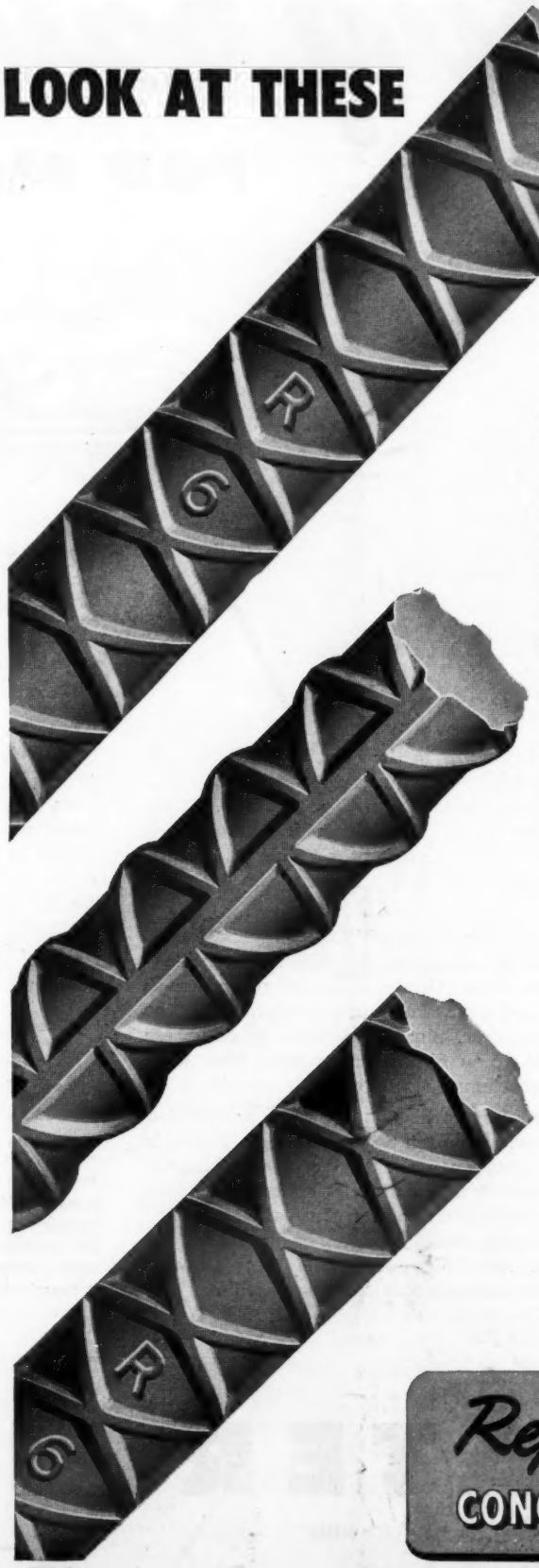

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That's because they were designed to exceed ASTM Specification A-305-49 —"Minimum Requirements for the Deformations of Deformed Steel Bars for Concrete Reinforcement."

This specification—adopted by ASTM in June, 1949—is the first standard specification to define the surface deformations on concrete reinforcing bars. It requires that the lugs or deformations be much higher and more closely spaced than heretofore, without change in standard foot weights.

The results: Greatly improved bonding properties and reinforcement anchorage—possible savings in steel, bending cost and installation.

Republic's Diamond Design Concrete Reinforcing Bars are rolled only from new billet steel—at Cleveland, Buffalo, South Chicago and Gadsden. Check the table below for foot weights and new size designations—then write us for further information.

REPUBLIC STEEL CORPORATION
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Size Number	Cross-Sectional Area, sq. in.	Nominal Diameter, in.	Foot Weight, lbs.
3	0.11	0.375	.376
4	0.20	0.500	.668
5	0.31	0.625	1.043
6	0.44	0.750	1.502
7	0.60	0.875	2.044
8	0.79	1.000	2.670
9	1.00	1.128	3.400
10	1.27	1.270	4.303
11	1.56	1.410	5.313

REPUBLIC STEEL

Republic
CONCRETE REINFORCING BARS

Blondes and Vandals Enliven Channel Job

(*Continued from preceding page*)

F. C. "Slewfoot" Bennett, fresh from the Cal-Tech Wind Tunnel and happy to get back on flood control.

Adolph Teichert's interests were supervised by J. P. "Jim" Cagle, Superintendent, assisted by Art Murphy. A. G. Harrisberger was in charge of bridges, L. F. De Stwolinski was Field Engineer, Art Towler was Concrete Foreman, Wade Johnson ran the grade, J. O. "Whitey" Shelton was in charge of excavation, Maurice Brotherton was Master Mechanic, and R. J. Smith was Office Manager.

Certain subcontractors, also, worked on the project. Pile driving for the bridges was done by Raymond Concrete Pile Co. Bethlehem Pacific Coast Steel Corp. furnished and Anthony C. Meeheleis placed the steel reinforcement. American Pipe & Construction Co. built the plastic sewer lining, and Macco Corp. drove the falsework piles for bridges. General Petroleum Corp. furnished all petroleum products used for lubrication.

New 10-Car Exhibit Of Electric Products

The General Electric Co., Schenectady 5, N. Y., recently unveiled its "More Power to America Special", the biggest electrical display kit ever built, G-E says. Almost ¼ mile long, the 10-car exhibit train represents the first attempt to display, in one series of related exhibits, the G-E Apparatus Department's complete range of products, systems, and techniques.

The "Special" will visit approximately 150 key industrial centers while on its nation-wide tour during 1950 and 1951. Its exhibits have been designed specifically to interest those who produce and use electric power, and will not be open to the general public.

Individual exhibits, many of them operating, include turbines, conveyor and material-handling systems, transmission equipment, motors of all sizes and ratings, complex drive systems, renewal parts kits, industrial and street-lighting fixtures, precision instruments, welding and heating equipment, diesel-electric switchers, controls, railroad equipment, etc. Wherever possible, actual apparatus has been displayed aboard the "Special." Where size and weight limitations have made this impractical, scale models or other representations have been used.

The exhibit material is designed to put the visitor in the position of an actual user of the equipment. He can "operate" a diesel-electric locomotive, for example, and model switchers and cars will follow his control. Most major exhibits go through an operating cycle automatically or can be energized by visitors.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 29.

Drilling-Equipment Folder

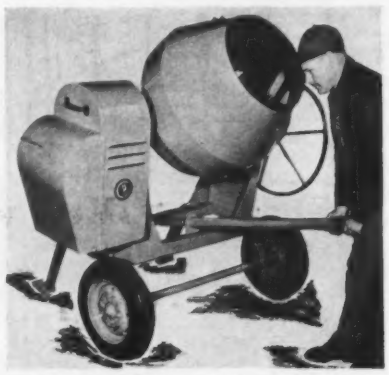
A 4-page folder describing the mobile Portadrill designed for shot holes, core drilling, shallow oil wells, and water wells has been issued by The Winter-Weiss Co., 2201 Blake St., Denver 2, Colo. It describes and illustrates the rig's "unitized construction" and gives details on the split-shaft power take-off, transfer case, draw works, rotary table, swivel, shock-hammer breakout tongs, kelly bushing, and crown block. Complete specifications, along with information on truck modifications and special equipment available, are included in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 118.

Tilting Mixer, 3½-S

A new 3½-S end-discharge Wonder tilting mixer has been developed by The Construction Machinery Co., Waterloo, Iowa. The method of close-coupling the drum power mechanism is designed to provide a simple, efficient drive. The new 3½-S has the CMC tilting mechanism, with a convenient brake and a large hand wheel to minimize operator effort and provide control when positioning the balanced drum.

Powered by an air-cooled engine, the Wonder Tilter features "figure 8" mixing action; semi-steel cast drum with leakproof alloy-steel cone; Timken-equipped drive and drum shaft; roller chain drive with cut steel sprockets; one-piece welded steel frame with cantilever springs; as well as Timken-bearing pneumatic-tired wheels.



The new CMC Wonder tilting mixer, 3½-S.

Further information on this mixer may be secured from the company. Or use the Request Card at page 16. Circle No. 74.

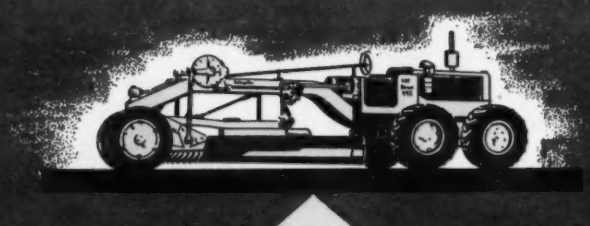
Film on Vermiculite

A new sound film showing the uses of vermiculite products in construction has been issued by the Vermiculite Institute. It is called "Vermiculite, the Wonder Mineral", and runs about 18 minutes.

If you wish to obtain it on loan, write to E. R. Murphy, Executive Secretary, Vermiculite Institute, 208 S. LaSalle St., Chicago 4, Ill. There is no charge for the use of the film.

Buy balanced

FOR MORE WORK



SPEED
WEIGHT
POWER

THE OWNER of the "Cat" No. 212 Grader shown here has a unique problem. "Can't keep operators away from the rig," says D. W. Klock, vice president of the Klock Construction Company, Amarillo, Texas. "This Motor Grader is so fast, maneuverable and well balanced, the boys *all* want to run it!"

Balance is the secret of "Cat" Graders' popularity with owner and operator alike. "Caterpillar" builds each Motor Grader from the ground up as an individual unit. The correct weight, plus the right horsepower, plus rated work speed—these things add up to *balanced* machines that solve your job problems at lower cost.

Informed buyers are finding that *assembled* motor graders are often poorly balanced. It stands to reason that when one engine or one frame is used for more than one model, the best use cannot be made of weight and power. But balanced "Cat" rigs are neither muscle-bound nor jumpy on the job. Their matching power cuts costs through superior performance and longer service life.

There's a size "Cat" Motor Grader for every type of work—with the stamina, punch and balance to do a particular job best. And don't forget what world-famous "Caterpillar" dealer service means in keeping equipment on the job—cutting down-time to the bone. Ask your "Caterpillar" dealer to show you his Motor Graders' bonus features—from tough blades with the maneuverability of a boarding-house reach, to "Hi-Electro" hardened final drive gears built to last.

LOOK UNDER THE HIDE

Fuel pumps are "Caterpillar"-designed and "Caterpillar"-built. Made of the cleanest high-chromium, high-carbon alloy steel obtainable, the pump plungers and barrels are diamond lapped. Pumps are heat-treated to maximum hardness to give users thousands of hours of trouble-free economical service. There is an individual pump for each cylinder. Pumps are adjustment-free and completely interchangeable. Look under the hide for quality—it doesn't show on the outside, it shows up in performance.

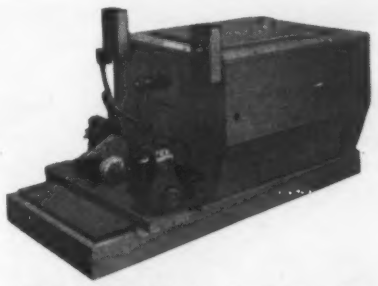
CATERPILLAR

REG. U. S. PAT. OFF.

Heats Pipe Coating

A new kettle in which to heat coating compounds for pipe lines is announced by W. E. Grace Mfg. Co., 6008 S. Lamar St., Dallas, Texas. Pipe-coating material presents a difficult heating problem, the company says, due to the large quantities of finely ground particles which tend to settle unless vigorously agitated. Temperatures must be held within close limits to avoid applying the material too cold or burning hot.

In the new Model 700, which is a 12-barrel kettle, a swinging agitator consisting of two adjustable scrapers 45 degrees apart covers the entire bottom of the kettle at 7 to 10 strokes per minute. A fluid coupling in the agitator drive permits the agitator to stall completely without damaging any parts, Grace says.



An agitator in the new Grace kettle for heating pipe-coating compounds discourages settlement of the material.

For field use the unit is powered by a 4-hp engine. The burner operates on kerosene or diesel fuel, and is completely automatic, being electrically ignited and turned on or off by an adjustable thermostat immersed in the melted material. Also available is a manually operated burner or natural-gas automatic burner.

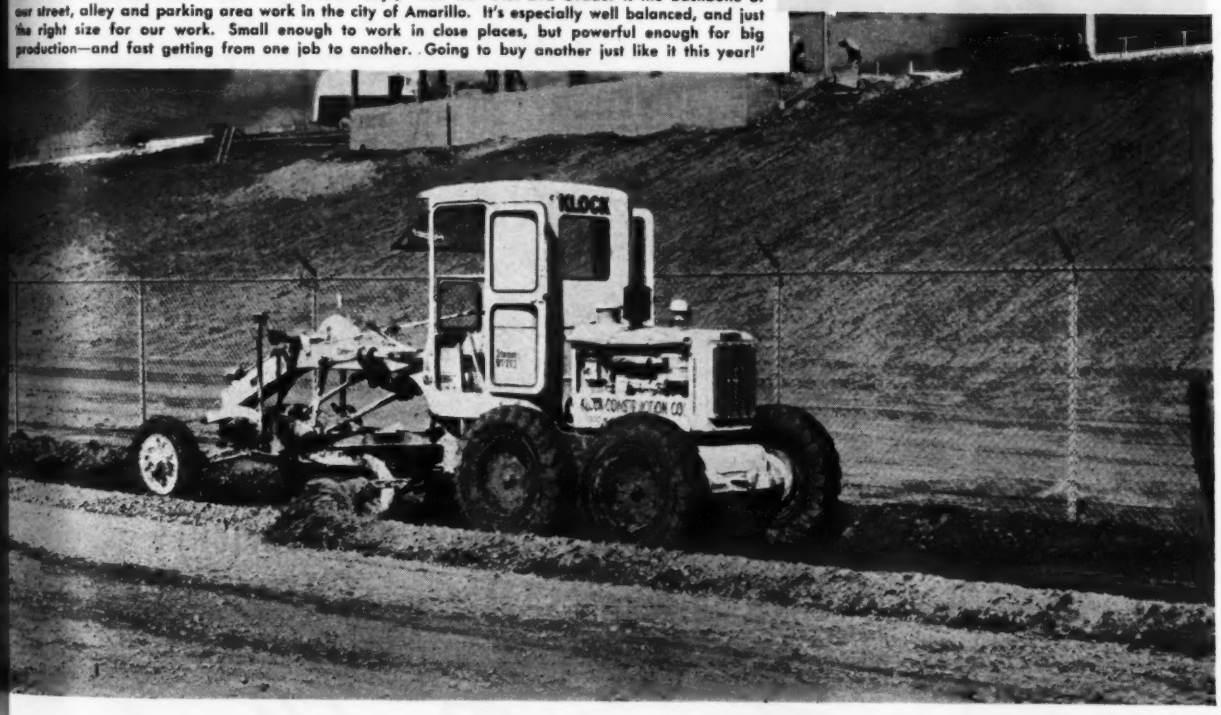
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 4.

Into Field Sales for Heil

Jack Konold, who used to be a sales correspondent for the Road Machinery Division of The Heil Co., Milwaukee, is now Sales Representative for the division in District 4 at Milwaukee. Howard Degen fills the vacancy created by Konold's move to field sales.

"Cat" graders AT LESS COST

Here's the Klock Construction Company's "Cat" No. 212 Grader working on the new municipal football stadium in Amarillo. Does subgrade, shoulder work and drainage. It's punched the Klock Co.'s time clock for 5186 hours of work. D. W. Klock says, "This 'Cat' No. 212 Grader is the backbone of our street, alley and parking area work in the city of Amarillo. It's especially well balanced, and just the right size for our work. Small enough to work in close places, but powerful enough for big production—and fast getting from one job to another. Going to buy another just like it this year!"



NO. 12

In a No. 12 "Cat" Motor Grader you get a No. 12 from stem to gudgeon. The "Cat" Engine was built for a frame that gets full use out of its 100 hp. And the working speed range was engineered to get maximum production at each speed.

WEIGHT	22,200 lbs.
ENGINE	100 hp.
SPEEDS: 1st	2.3 mph.
2nd	3.6 "
3rd	5.5 "
4th	8.5 "
5th	12.0 "
6th	19.3 "
1st R.	2.7 "
2nd R.	4.1 "

Price of the standard model No. 12 is $10,920, f.o.b. Peoria, subject to change without notice.

NO. 112

With the No. 112 you get the No. 112's 75 hp. Engine on a No. 112 frame, with a No. 112 weight and a No. 112 transmission. You don't get mismatched power, weight or speed.

WEIGHT	19,330 lbs.
ENGINE	75 hp.
SPEEDS: 1st	2.1 mph.
2nd	3.0 "
3rd	4.0 "
4th	5.6 "
5th	11.2 "
6th	16.0 "
1st R.	2.8 "
2nd R.	4.0 "

Price of the standard model No. 112 is $9545, f. o. b. Peoria, subject to change without notice.

NO. 212

When you buy a No. 212 you get the same balanced performance. It has its own weight, its own frame, its own "Cat" Engine, its own working speeds.

WEIGHT: tandem drive	13,290 lbs.
single drive	11,010 "
ENGINE	50 hp.
SPEEDS: 1st	2.0 mph.
2nd	3.1 "
3rd	4.9 "
4th	11.9 "
R.	2.8 "

Price of the standard model No. 212 is $6435, f. o. b. Peoria, subject to change without notice.

DIESEL ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR, PEORIA, ILLINOIS
REG. U.S. PAT. OFF.

Panel Warns Against Upping F-A for Roads

A panel discussion during the Third Highway Transportation Congress in Washington, D. C., revealed growing concern over the future role of the Federal Government in highway development.

Participants were Charles L. Dearing of the Brookings Institution; Edward L. Schmidt, Chief Engineer of the Pennsylvania Department of Highways (the views of Mr. Schmidt, absent because of illness, were stated by his assistant, C. H. Buckius); Russell E. Singer, Executive Vice President of the American Automobile Association; and Anson S. Thomas, Director of the Tax and Legislative Department of the Indiana Farm Bureau.

William J. Cronin, Managing Director of the Automobile Manufacturers' Association, and moderator of the panel, opened the discussion by reviewing the benefits of the Federal-Aid program. He said, however, that the expansion of F-A beyond a certain point would destroy the value of the program, and that F-A should not become the major percentage of the nation's yearly road and street budget, since state and local government agencies could not then retain their independence.

Mr. Dearing, leading off the panel, called for a reversal of the "current trend toward rapid enlargement of the Federal role in highway development". He said that the present trend may lead to the "assumption of full ownership and responsibility by the Federal government for that portion of the highway system deemed of primary national interest", and that this would mean additional Federal encroachment on the legislative and policing functions of the states in respect to vehicle and highway regulation.

Mr. Schmidt was against any further increase in Federal-Aid and any further expansion of Federal activities in the management of state highway affairs. It is fallacious, he said, to reason that larger F-A appropriations are made necessary because of the inability of the states to finance their own programs. If the Federal government withdrew from the fields of gasoline taxation and motor excise taxes, it would have done more to improve the highway situation than could any possible increases in the Federal share for highway construction.

Mr. Singer stated the AAA's view that the Federal interest in roads should be confined to "a strictly limited mileage of general-purpose roads made up of an integrated system which in its total development is national in significance". He proposed the Interstate Highway System as the backbone of such a development, and urged increased Federal sharing in the costs of this system. The AAA, he said, sees no "justification whatever for the extension of Federal Aid to strictly local and rural roads or strictly urban roads and streets".

Repeal of the Federal automotive excise taxes, and emphasis on the states' own basic responsibility for highways, were urged by Mr. Thomas. He charged that there is a tendency to link receipts from these emergency Federal taxes with the amount of Federal Aid furnished on highways. If such a linkage is made, he warned, the Federal government will "become the dominating highway administration and construction agency, since controls always accompany the disbursement of money".

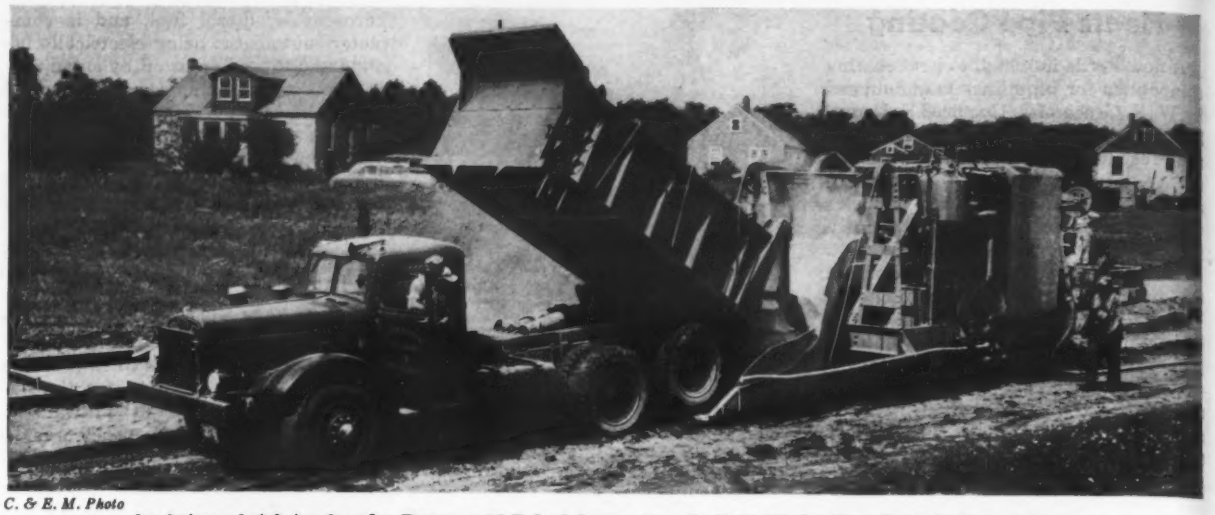
Mir-O-Col in Chicago

In order to provide quick shipping service to its eastern and middle-western customers, Mir-O-Col Alloy Co., 312 North Ave. 21, Los Angeles, has established a complete warehouse stock of all sizes and types of its hard-facing alloys at 518 N. Bishop St., Chicago.

First Link Paved On N. J. Parkway

New State Route 4 Has Dual 24-Foot Lanes of 8-Inch Plain Concrete on 8-Inch Gravel Sub-Base

By WILLIAM H. QUIRK,
Eastern Editor



C. & E. M. Photo

An Autocar batch truck and a Ransome 34-E dual-drum paver do their bit for New Jersey's first parkway.

✦ NEW Jersey's first parkway, for passenger cars only, will eventually extend from the New York border in the northeast corner, south 160 miles, to the southerly tip of the state at Cape May. Construction of this new superhighway, known as State Route 4 (Parkway), started in 1946, but its entire length across the state will not be completed for years to come. Estimates place the total cost of construction around $160,000,000.

The first section of the parkway, however, was scheduled to be opened this past spring. The initial paving contract on the big project lies west of Rahway in Middlesex and Union Counties. It runs from Inman Avenue north 3½ miles to Centennial Avenue, passing through three different townships. The New Jersey State Highway Department awarded a contract for the dual 24-foot concrete roadways to the Union Building & Construction Co. of Passaic, N. J., on its low bid of $1,241,000.

While this was the first paving work, it was preceded by six other contracts covering the grading, drainage, and structures. On this short stretch alone there are 12 bridges, for the parkway will have limited access and no crossings at grade. So far, 10 miles of parkway have been graded from near Cranford, in Union County, south to State Route 35 at the Edison Bridge crossing of the Raritan River. Fine-grading, together with the placing of the gravel sub-base, was included in the paving contract.

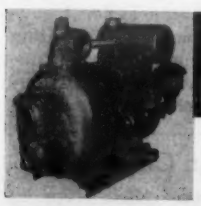
Dual Roadways

The dual 24-foot pavements are 8-inch uniform plain-concrete slabs laid in 12-foot lanes on an 8-inch gravel sub-base which is carried out under the shoulders. The pavement is crowned at the center with a 1 per cent slope to the edges. The outer shoulder is 10 feet wide—the inner 3 feet being bituminous and the outer 7 feet being of stabilized turf. The slope on both is minus 5 per cent. The bituminous portion of the shoulder is 7 inches thick and consists of a 4-inch macadam base topped with a rough-texture bituminous penetration surface 3 inches in depth. The steepest side slopes are 2 to 1.

On the inside of the roadway there is a similar 3-foot bituminous shoulder flanking the pavement. The normal center divisor strip is 54 feet wide, topsoiled 6 inches thick. At the center the parkway median is depressed one foot below the pavement level.

At the start of paving operations, late in July, 1949, the contractor fine-graded the roadways, and then laid the 8-inch gravel sub-base. Material was dug from a pit 12 miles away by a Thew-Lorain 2-yard shovel, and loaded into a fleet of trucks which numbered as many as 40. As they end-dumped on the roadway, the gravel was spread by an Allis-Chalmers HD-19 tractor-dozer,

(*Continued on next page*)



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...Lower cost

DUAL VOLUTES, fast priming, non-clogging portable, long lasting centrifugal pumps. Distributors—write for attractive proposition.

OHLER MACHINERY CO.
WATERLOO IOWA

Roebling Preformed Lang Lay "Blue Center" Steel Wire Rope lasts longer; brings fewer shut-downs; cuts down replacement time; saves wire rope dollars.

For rope research and developments that help you save...

Today it's Roebling!

YEAR BY YEAR, industry makes new and more stringent demands upon wire rope . . . and Roebling leads in developing types that meet these demands with utmost efficiency and economy.

Take Roebling Preformed "Blue Center" Wire Rope with Independent Wire Rope Core!

No finer rope has ever been made, and its basis is "Blue Center" steel—an exclusive Roebling development. Its high resistance to abrasion, shock and fatigue spells long life . . . To this, Roebling *Preforming* brings the further advantages of new handling ease and improved performance . . . And the addition of I.W.R.C. assures top resistance to operating pressures and provides increased rope strength.

Roebling makes a wire rope of the right construction, grade and size for every type and make of rope-rigged equipment. Have your Roebling Field Man recommend the best rope for low-cost performance on each of your installations.

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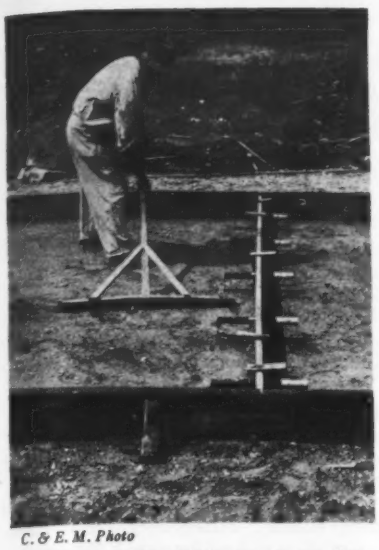
JOHN A. ROEBLING'S SONS COMPANY, TRENTON 2, NEW JERSEY



C. & E. M. Photo

Wood expansion joints go in on the New Jersey Parkway. The five dowels that pierce them are held by Springfield joint assemblies.

and compacted by a Bros rubber-tire roller and a Buffalo-Springfield 10-ton 3-wheel steel roller. The rubber-tire roller was pulled by an Allis-Chalmers HD-5 tractor.

Sub-base drainage was taken care of with sub-base outlet trenches, 1 foot deep and 5 feet wide at the top, filled with ⅜-inch stone. They ran diagonally across the road and tied in to catch basins through 6-inch corrugated perforated metal pipe. Catch basins were spotted about 300 feet apart, usually in the center parkway section or else just outside the pavement.

12-Foot Lanes

Since the grade-separation structures were not fully completed at the start of this work, the paving contractor began operations at the middle of the job. He moved southward on the outside lane to the end of the project; then paved the outside lane on the northbound roadway north as far as his starting point. The inside lanes were completed next, finishing the southerly end of the contract. By that time the bridge work to the north was finished, permitting paving to proceed at that end.

The pavement was laid in 12-foot lanes within Blaw-Knox forms. The contractor had 9,000 linear feet of forms on the job, and kept from 1,500 to 2,000 feet ahead of the paver at all times, although the specifications required only 800 feet of forms and grade to be in readiness.

After a Caterpillar motor grader had shaped the base course, the form trench was cut by hand and the forms set in line. Form pins were driven with a pneumatic hammer powered by a Jaeger 210-cfm truck-mounted air compressor. On the first lane the form next to the adjoining slab was equipped with a metal keyway so that the butt joints in the concrete would bond together better. The outside form also had a keyway in case a third lane might at some future time be added to each roadway. The keyway is ½ inch thick and 1¾ inches deep, and was welded to the forms.

Wood Expansion Joints

After the forms were properly set for line and grade, any excess material between them was thrown off into the center parkway strip by a Buckeye Finegrader which rolled along on the form rails. This was followed by a steel planer which cut to the precise 8-inch depth, after which the grade was checked by a Cleveland scratch template.

Wooden expansion joints were placed across the lane at 40-foot intervals. They consisted of a strip of dressed, treated lumber filler, 1 inch thick x 6¾ inches deep. Through each 12-foot joint went five dowels on 2½-foot centers. They are 1 7/16 inches in diameter x 13¾ inches long, and are held by a Springfield joint assembly. Under each dowel is a bearing plate, 15 inches long x 3½ inches wide x ¼ inch thick, resting flat on the ground.

Around each joint the sub-base was rolled again with a hand roller, and smoothed over with a short wooden straight-edge, 3 feet long. The assembly was held in place by 5 pins driven into the ground, and a metal cap with a 1½-inch lip on each side was slipped over the top of the wooden joint filler. On the side toward the paver the dowels were oiled, then covered by a paper tube with a cork stopper. The forms were also oiled and the sub-base was wet down in preparation for the concrete paving.

Paving From Outside the Forms

Water for wetting the sub-base and for the concrete mix was taken from near-by city hydrants, and carried to the job in two GMC 1,200-gallon tank trucks. A 50-foot length of 2-inch hose supplied the paver, a Ransome 34-E dual-drum equipped with a 40-foot boom. The paver worked outside the forms, and was supplied by a fleet of batch trucks, either Macks or Autocars, holding 3 or 4 batches. From 11 to 18 trucks were used, depending on the length of haul. They were owned by the Union Building Trucking Co. of Pompton Lakes, N. J., an affiliate of the contracting firm. Each batch compartment has a separate metal bin for holding the cement.

The materials were batched at the Commonwealth Concrete Co., a commercial plant in Summit, N. J., 10 miles from the center of the job. Pioneer cement from the National Cement Co. at Brodhead, Pa., was used in the mix. It contained Vinsol resin, an air-entraining agent that was interground at the mill. The North Jersey Quarry Co. supplied the fine and coarse aggre-

(*Concluded on next page*)

The Original and Only

"More Power Puller"

Unexcelled for many construction uses, moving machinery, handling equipment, rigging, pulling stumps, stretching fence, moving and opening railroad cars and many other uses.

LIST PRICE $27.75 TO $33.80

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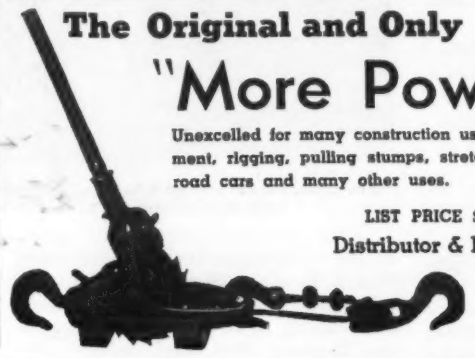
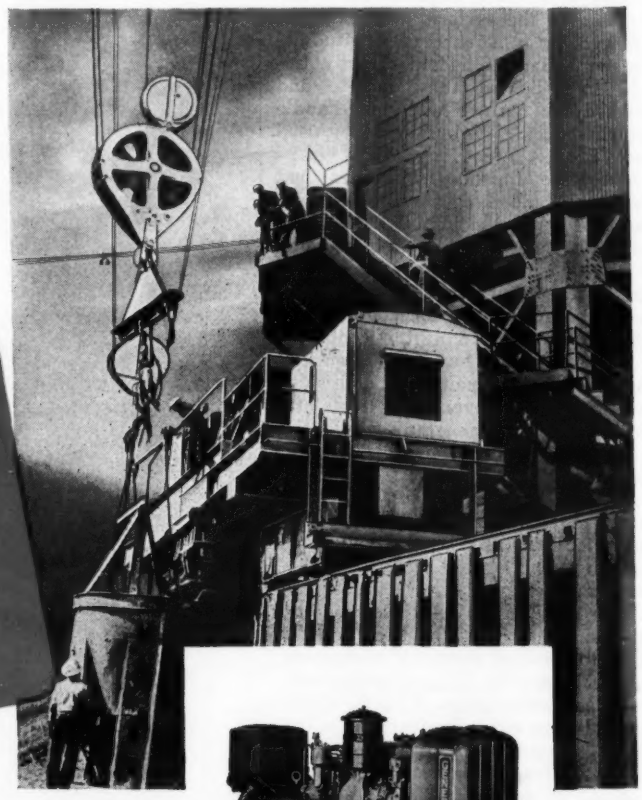
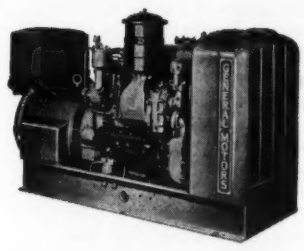


THE WYETH-SCOTT CO.
Newark, Ohio

A CONCRETE Case for GM DIESEL POWER



Built by Washington Iron Works, Seattle, the concrete cars at Hungry Horse Dam have a top speed of 5 m.p.h. with a capacity pay load of 32 tons. Each is equipped with a 4-cylinder GM Series 71 Diesel generator set furnishing power to two 20-h.p. traction motors.



THREE specially built Diesel-electric concrete cars, used by the General-Shea-Morrison group at Hungry Horse Dam, are a vital link in the carefully planned facilities with which the contractor expects to place a million cubic yards of concrete this year.

Carrying two 8-yard side dump hoppers, the cars move concrete from the mixing plant to points directly under cableways where they discharge into buckets. This eliminates time lost moving buckets on and off cars—saves travelling time of the 500-ton cableway tail towers—increases cableway capacity by at least 25%.

It's a job that calls for smooth coordination. There can be no failure or falter. Shutdowns would be costly. So General Motors Diesel generator sets were a natural choice to power these cars.

Because they are 2-cycle, with power at every downstroke, GM Series 71 engines are compact, smoother in operation and quicker starting. They are designed for easier servicing; have no high pressure fuel lines and offer maximum interchangeability of parts.

Add to these advantages their higher power-per-pound, their economy and rugged durability, and you'll see why contractors everywhere are turning to GM Diesels. Get the full story from your local equipment dealer or write direct to us.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES...*Up to 275 H. P.* **DETROIT 28, MICHIGAN** MULTIPLE UNITS...*Up to 800 H. P.*

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

First Link Is Paved On New Jersey Parkway

(*Continued from preceding page*)

gate, the sand coming from Morris Plains and the gravel from Netcong, N. J.

A 9.24-bag batch was used, mixed in the proportions of 1-1.50-3.36. This gave a cement factor of 6.7 bags to the cubic yard, and for the 8-inch pavement 1.489 bags were required for every square yard. The dry weights for a typical batch were as follows:

Cement	869 lbs.
Sand	1,355 lbs.
Gravel, 1½-inch	1,568 lbs.
Gravel, ¾-inch	1,568 lbs.

Concrete Finishing

Batches were mixed 1¾ minutes in the dual-drum paver, then discharged on the subgrade in front of a Jaeger-Lakewood dual-screed finishing machine. Along the forms the concrete was vibrated with a Viber vibrator hooked to a Master 1-kw generator driven by a Wisconsin gas engine. The transverse finishing machine made two passes over the surface, and was then followed by a Koehring Longitudinal Finisher. Hand finishers directly behind hand-floated the concrete and checked the surface with long-handle straight-edges. The bullfloat they used was a 2 x 6, 4½ feet long.

After the finishing machines had passed, the metal caps were removed from the expansion joints. A finishing strip, 1½ inches high x 1 inch wide, was nailed across the top of the wooden joint, so that it projected about ½ inch above the surface of the concrete. A 6-foot float, notched at the center to fit this projection, was then worked along the joint to insure that both sides were flush and level. A 3-foot-long burlap drag was then pulled over the slabs, and the surface was roughened slightly with a broom. As the concrete attained a slight set, the finishing strips were removed from the joints. A dual edging tool was used on the transverse joints to get both sides even.

Joints are shaped to a ¼-inch radius, and the longitudinal joint between the abutting slabs was finished with a trowel to a 1-inch depth. The concrete was cured with Wall's spray compound, a colorless nonbituminous liquid, which was applied as a membrane cover at the rate of 200 square feet to the gallon by a Heltzel Flex-Plane automatic spray machine. After the full 24-foot pavement was in, the longitudinal and transverse joints were cleaned out and poured with tar. When the second 12-foot lane was being laid, rubber wheels were put on the finishing machines where they rode along the first concrete slab. In the best day's run of 10½ hours, 51 slabs—40 x 12 feet—were laid, or a total of 2,040 linear feet of one-lane concrete.

Quantities and Personnel

Paving progressed at a steady pace and was completed by the end of last year. The landscaped center strip, featuring New Jersey dogwood trees and hollies, was scheduled to be finished in the spring of this year so that the first section of the parkway would be ready for the heavy shore resort traffic in the summer.

The major items in this first 3½-mile parkway paving project included the following:

Roadway excavation, dirt	36,290 cu. yds.
Borrow excavation	75,015 cu. yds.
Sub-base	43,070 cu. yds.
Subgrade	112,471 sq. yds.
Topsoiling, 4-inch	76,844 sq. yds.
Topsoiling, 6-inch	59,715 sq. yds.
Macadam base course, 4-inch	41,700 sq. yds.
Macadam base course, 5-inch	13,368 sq. yds.
Modified penetration; macadam intermediate course, 3-inch	18,865 sq. yds.
Penetration macadam surface course, 3-inch	31,331 sq. yds.
Bitumen	110,400 gals.
Concrete pavement, plain, 8-inch	106,996 sq. yds.
Dowel-type transverse joints	23,031 lin. ft.
Fertilizing and seeding	46,661 sq. yds.

The Union Building & Construction Co. employed a force averaging 75 men on the contract, under the direction of Dow R. Drukker, Superintendent.

For the New Jersey State Highway Department, H. D. Robbins is Construction Engineer, Neil MacDougall is District Construction Engineer, and E. C. Benoist is Resident Engineer. The Department is headed by Ransford Abbott, State Highway Commissioner. E. W. Kilpatrick is State Highway Engineer.

C. & E. M. Photo
The paver bucket lets go a batch of concrete in front of a Jaeger-Lakewood dual-screed finishing machine. A Viber vibrator will be used along the forms.

Planting in Pennsylvania

A big roadside and slope-planting program was scheduled in Pennsylvania this season to keep pace with an equally big highway construction program. The spring planting brought 1,100 new shade trees to the borders of the state's highways. Principal tree varieties, Chief Highway Forester Wesley L. Hottenstein reported, were oak, elm, and maple—with plantings mainly concentrated along new construction. Another 1,100 trees—redbud, flowering dogwood, and mountain ash—were included in the roadside conservation program.

The total evergreen planting will reach 1,400, with red pine, white pine, and hemlock predominating. Principal shrub plantings are 250,000 coralberry, ninebark, and bush honeysuckle. Principal vines for ground cover are 175,000 honeysuckle, bittersweet, and roses (multiflora and wichuriana). Tree seedlings include 150,000 black locust, whose heavy root system makes them particularly valuable on slopes.

DIRT SEALED OUT!
BEARINGS LAST LONGER

. . . when lubricated with TEXACO MARFAK

Dust, mud, moisture—they can't get into bearings protected with tough, tenacious *Texaco Marfak!* Protection is twofold. Inside the bearings, *Texaco Marfak* maintains a fluid, wear-resisting, lubricating film. At the bearing edges, it retains its original consistency — forming a "collar" that seals the lubricant in, seals contaminants out.

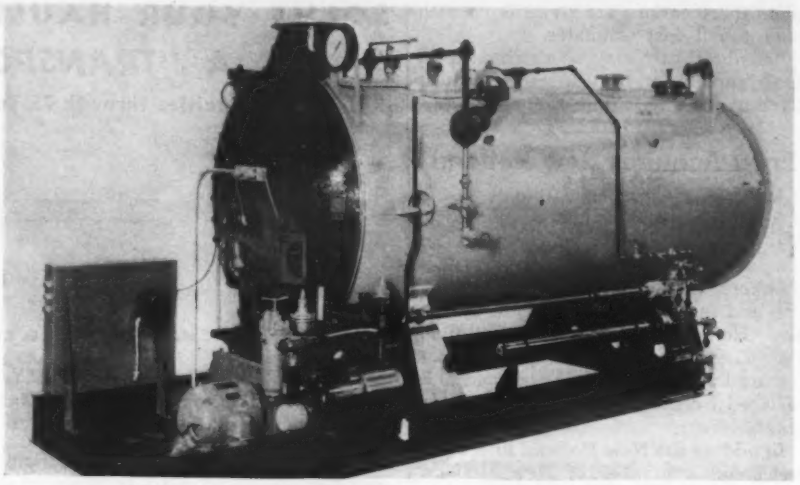
Texaco Marfak affords protection against rust and wear . . . assures fewer repairs and replacements . . . reduces maintenance costs. In addi-

TEXACO

New Self-Contained Boiler Is Automatic

A new Model LR self-contained boiler for processing and heating has been announced by the Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis. Burning heavy fuel oils or gas, the new boiler features a rotary burner said to be simple in design, compact, and fully automatic. A single low-speed blower furnishes all air for combustion. A drip and dust-proof panel which is totally enclosed protects major electrical controls. Electric combustion safety devices and dual low-water cut-offs are standard equipment. The simplified design of the combination gas-oil burner is said to permit rapid changeover from oil to gas, or the reverse, in less than a minute.

The Model LR is of all-welded construction, designed to meet the standards of the ASME boiler code, leading insurance underwriters, and burners approved by Underwriter's Laboratory. The four-pass construction is designed to provide 80 per cent fuel efficiency and offer applications to the construction industry for asphalt production and dredging operations.



A new combination gas and oil-burning boiler, the Cleaver-Brooks Model LR.

Further information may be secured from the company by requesting Catalog SG-142. Or use the Request Card at page 16. Circle No. 72.

Concrete Body Is Improved in Design

Design improvements in the new Dumpcrete body enable fast delivery and placement of premixed concrete, according to an announcement by the Dumpcrete Division of Maxon Construction Co., Inc., 131 N. Ludlow St., Dayton 2, Ohio.

The swinging baffle inside the body has been increased in overall height and relocated to improve the discharge action of the concrete. The gate wings are higher than before to permit fast, easy unloading. The sides of the hopper section of the chute have been increased to eliminate concrete overflow, and a swing-away type of chute has been added to the 4-yard body, making this feature standard on all three sizes.

For the driver's convenience, strap steps are provided on the front and rear running boards, and gate-discharge handles are easier to reach. The fenders on the new models have been increased to cover the dual rear tires. Splashboards, gate-wing covers, bulk-cement covers, 8-inch sideboards, cab protectors, and special partition baffles are now available as accessory equipment.

Further information may be secured from the company by requesting Pamphlet L-106. Or used the Request Card at page 16. Circle No. 53.

Thermal Container

A new liquid container called Therm-O-Can, available in 3 and 5-gallon sizes is being made by the Therm-O-Can Co., a division of General Wheelbrarrow Co., Inc., 702 E. 10th St., Wichita 5, Kans. The new container features spun-glass insulation to keep water cold for construction crews during the hot summer months. Its exterior is a hard-temper heavy-gage aluminum alloy especially designed for field use. The Therm-O-Can may also be used in the winter to carry and serve hot food or coffee.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 45.

Variable-Weight Rollers

Information on a line of variable-weight 3-wheel rollers is contained in a new 16-page catalog released by The Buffalo-Springfield Roller Co., Springfield, Ohio. In addition to specifications and pictorial treatment, the catalog also suggests the rollers to choose for particular requirements.

The catalog features five models ranging from 5 to 7-ton capacity for miscellaneous work, up to the largest models with working weights from 10 to 12 tons. Standard engines are 6-cylinder industrial-type gasoline-power units; however, 4 or 6-cylinder diesel engines are also available. The Buffalo-Springfield 4-speed transmission is explained in nontechnical language. This is an exclusive unit which provides four overlapping speeds covering a range from 1.1 to 5.0 mph under full governor control. Optional accessories for the rollers include hydraulic or self-energizing scarifiers, large-capacity sprinkler systems, cabs or umbrellas, electric lights, upholstered seats, and water pumps and hose.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 25.

Three Moves at Atlas

Stephen M. Wilson, Jr., is now Manager of the Joplin, Mo., District Explosives Sales Office for Atlas Powder Co., Wilmington, Dela., assisted by Paul D. Mayfield. D. J. C. Copps, Joplin Manager since January, 1949, has been transferred to the company's general offices in Wilmington as Special Assistant to R. K. Gottshall, Assistant General Manager.

tion, *Texaco Marfak* far outlasts ordinary chassis grease. Fewer applications are needed.

In wheel bearings, you get this same cost-saving protection by using *Texaco Marfak Heavy Duty*. Bearings last longer . . . and its self-sealing property assures safer braking. No seasonal change is required.

Two other maintenance savings

Upkeep costs for engines — heavy-duty gasoline or Diesel — come down when you lubricate with *Texaco Ursa Oil X★★*. It cleans as it lubricates . . . helps reduce fuel consumption.

Crawler track mechanisms run better, last longer and cost less for maintenance when lubricated with *Texaco Track Roll Lubricant*. It seals dirt and moisture out of bearings even under severe conditions.

Find out how Texaco top-quality lubricants and the Texaco Simplified Lubrication Plan can help your machinery do more work at lower cost.

Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

MORE THAN 350 MILLION POUNDS OF MARFAK HAVE BEEN SOLD!

Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

Here the Shaw ripper mounted on an Allis-Chalmers HD-5G Tracto-Shovel, digs into hard-packed earth.

Heavy-Duty Ripper

A new heavy-duty ripper has been announced by Shaw Sales & Service Co., 5100 Anaheim Telegraph Road, Los Angeles 22, Calif. It attaches to the Allis-Chalmers HD-5G Tracto-Shovel and to the HD-5 tractor equipped with hydraulic-controlled bulldozer using a front-mounted pump.

The new ripper will loosen decomposed granite, hard-packed earth, adobe, old asphalt, macadam, etc. to a maximum depth of 15 inches. A hydraulic lever control from the operator's seat sets the ripper to desired operating depth or lifts it clear for transport.

The Shaw ripper is complete with ripper frame, 4 shanks and ripper points, hydraulic cylinder, hose and fittings, and attachment bolts. The frame is built to take up to 7 ripper shanks with shank holes spaced on 12-inch centers for any desired combination. Ripper shanks are 1¾ inches thick, 3 inches wide, and 24 inches long. Points can be removed from shanks for resharpening or replacement when worn. Shank locking is by metal wedge. The unit has a maximum ripping width of 72 inches. It is of all-steel construction, electrically welded and braced.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 138.

Belt Conveyors Restyled

The Redi-Fab series of conveyors made by Barber-Greene Co., Aurora, Ill., has been restyled and a new 40-page catalog tells all about it. The series offers 49 lengths, 3 widths, 5 different drives, and many accessories.

Packaged into simple components to give a variety of combinations, Redi-Fab is easy to select and erect, according to Catalog RF. Individual selections for particular needs may be made without a detailed technical knowledge of conveyors. For example, B-G points out, the horsepower of the motor and the horsepower of the drive are automatically correct without any calculation.

The catalog includes a "Redi-Fab Conveyor Layout Sheet", which is designed to enable the user to make his own layout right down to the location and selection of supports. The five new drives in the series include partial reductions for driving the conveyor from the power take-off shaft of some other piece of equipment, such as a crusher. All three new feeders in the series—reciprocating, apron, and belt—are driven from the footshaft of the conveyor.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 130.

Portable-Breaker Data

A folder describing the Warsop portable breaker is available from Warsop Power Tools, Inc., 347 N. 12th St., Philadelphia, Pa. The breaker is designed for many applications: asphalt cutting and trimming, digging hardpan, demolition, driving sheathing and fence posts, tamping backfill, trench spading, etc. The literature lists full mechanical and operating features of the unit. Complete specifications are given along with operational cost estimates.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 94.

Iowa Acquires New Holland

Iowa Mfg. Co., Cedar Rapids, Iowa, has acquired the complete inventory, manufacturing rights, and patents on the line of double-impeller impact breakers, vibrating screens, roll crushers, and feeders formerly made by the New Holland Mfg. Co. of Mountville, Pa. These products will now be manufactured at Cedar Rapids and sold and serviced by the Cedarapids distributor organization.

In adding the New Holland line, Iowa welcomed a number of New Holland personnel, including J. D. Pfahl, Assistant to the Sales Manager, Bud H. Kessler, Chief Engineer, and four other New Holland engineers who are now part of the Iowa engineering department.

SOLVE YOUR HAULING PROBLEMS WITH A "TRANSPORT TRAILER"

Capacities through 75 Ton—Semi and Full Trailers

CARGO CARRIER MODEL GPX (Semi) with Tandem Axles

PATENTED TANDEM AXLE ASSEMBLY—Featuring unusual lengthwise and sidewise wheel accommodation to irregularities in the road. Use of full width tubular, forged, heat treated axles with CAMBER.

FRAME—Constructed of beam sections throughout, electric welded. A ruggedly strong and efficient unit with minimum weight.

TRANSPORT TRAILERS, INC.

TRANSPORTATION ENGINEERING A SPECIALTY

CEDAR RAPIDS, IOWA, U.S.A.

Now! Ford Trucks in biggest Economy Run ever made!

To demonstrate Ford Truck Economy

...THROUGHOUT THE UNITED STATES...IN EVERY IMPORTANT TRUCK-USING VOCATION

...IN YOUR KIND OF BUSINESS, WITH YOUR SIZE TRUCKS!

The Ford Truck Economy Run, most realistic economy study in truck history, is now under way throughout the United States.

It's extensive! Thousands of truck users from coast to coast are making the Ford Truck Economy Run over their regular routes. Every important kind of truck-using business is included.

It's all-inclusive! All Ford Truck models from 95-h.p. Pickups to 145-h.p. Big Jobs will participate under actual day-to-day working conditions. Detailed records will be kept on operating costs for a period of six months.

It demonstrates Ford Truck economy! The Economy Run will demonstrate for everyone to see, what Ford owners have known right along. Ford Trucks do more per dollar in every kind of truck-using business. And this means they will do more per dollar for you in your business!

Economy—one reason why Ford is America's No. 1 Truck Value! And *Value* is one big reason why more and more truck users all over the country are switching to Ford. Ford Trucks are making the truck industry's biggest sales gains.

Switch to Ford Trucks to feel the difference—in your pocketbook. See your nearest Ford Dealer today!

In the long run, too—Ford Trucking costs less because

FORD TRUCKS LAST LONGER

Using latest registration data on 6,592,000 trucks, life insurance experts prove Ford Trucks last longer!

A New Parts Depot Goes Up in the South

(*Continued from page 1*)

6-inch welded wire mesh.

For the some 120 footings for the interior columns, the original design called for the conventional spread footings constructed with wooden forms. These were to be built separately from the floor slab. Ragnar Benson, Inc., Engineers and Builders, of Chicago, which is constructing the depot for International Harvester, came up with an alternate design for the interior column footings. This plan called for pouring the slab and footings together as a monolith, with the ground cut to serve as a form for the footing.

Interior Column Footings

These interior column footings go into the ground from 1 to 1½ feet below the bottom of the 6-inch floor slab. Their bottom dimensions vary, being from 4 to 5 feet square. At the bottom they are reinforced with either ½ or ⅝-inch rods going both ways. The sides of the footing cut are on a 45-degree slope. The shape of the footing was easily cut into the ground by hand. This general procedure was followed for all interior footings except those located along the expansion joints. The joints are ¾-inch premolded strips, and cut across the entire floor slab—three in a north-south direction and one going east-west. At the joints wooden forms were built for those footings on the line of the expansion material.

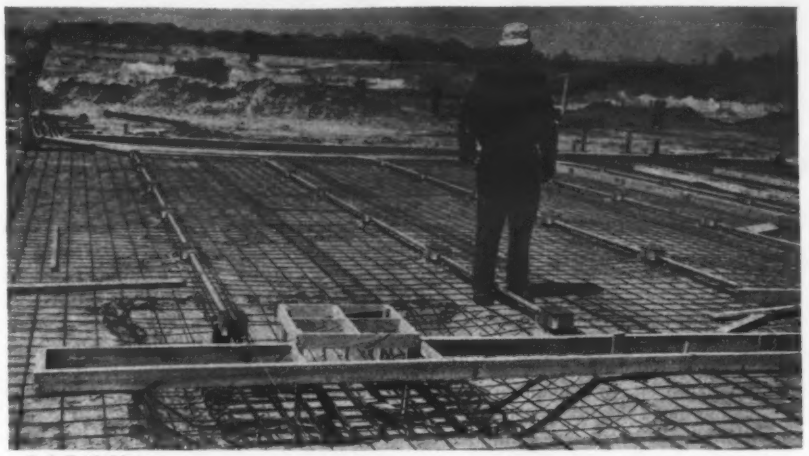
With the tedious form work by hand labor practically eliminated, entire blocks averaging 40 x 40 feet were poured monolithically with the interior footings. In pouring the office floor, Bryant floor boxes and outlets in the conduits were laid to proper grade and then embedded in the concrete slab.

Ready-mix concrete used throughout the building was supplied by Atlanta Aggregate Co., Inc., from a plant 8 miles from the job. From six to ten truck-mixers—3-yard Jaegers on International trucks—delivered the concrete which tested to 2,500-pound strength. The coarse aggregate was crushed granite, graded from 1¼ inches down to ¼ inch.

Concrete Operations

On nearly all the wall construction, Universal plywood forms and Universal ties were used. For the higher outer wall at the north side of the depot, where the spur track enters the building, the forms consisted of ⅝-inch plywood backed with 2 x 4 studs on 12-inch centers and double 2 x 4 wales on 2-foot 6-inch centers. Star ties held the opposite sides in position. The Hall Steel Co. of Atlanta furnished 27 tons of reinforcing steel for the job.

Of the approximately 5,000 cubic yards of concrete going in the warehouse, all but about 300 yards was chuted directly from the truck-mixers directly into place, either in forms or onto the prepared grade. Only for the north wall, beyond the spur entry track, was a work trestle required to reach the forms. Then the mixers discharged concrete into Georgia buggies which were rolled out on the runway and dumped into the forms. As the concrete was placed it was vibrated with Mall vibrators. Curing was done with water.



C. & E. M. Photo

Bob Conway, Engineer for Ragnar Benson, on the Atlanta parts-depot job, points to a footing ready for a monolithic pour with the foundation floor slab. This view shows Bryant floor boxes and outlets in conduits to be embedded in the floor slab of the office wing. Conventional footing forms were eliminated.

Over the big depot area, the first floor slab was given a wooden float finish which was topped by a ⅜-inch coating of mastic. In the office wing the concrete slab was given a trowel finish and then covered with asphalt tile.

Steel Framework

The Gage Structural Steel Co. of Chicago has a subcontract for furnishing and erecting the 600 tons of structural steel comprising the framework for the building. Bays are 22 x 40 feet, and the column schedule calls for 215 columns in the building. In the warehouse the typical column is an 8-inch 31-pound H-beam supported on a 12 x ¾ x 1-foot 0-inch base plate resting on a 12 x ¼ x 1-foot 0-inch bed plate. Two holes were drilled through the floor slab into the footing for the 1 x

(*Concluded on next page*)

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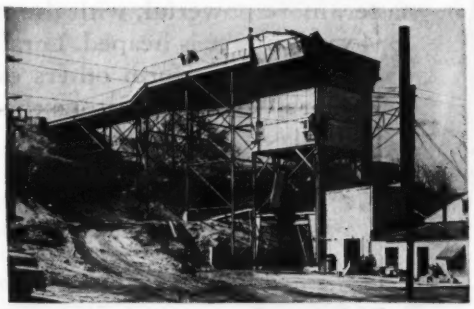

FOR CENTRAL MIXING This modern plant of the Clark Certified Concrete Company, Inc., of Baltimore, Md., produced 125,000 yds. of pre-mixed concrete during the past year. Vice-President Duncan writes: **"Your Blue Brute 84-S Stationary Mixer has proven entirely satisfactory. Maintenance costs have been practically nothing."**

FOR PORTABLE MIXING. Le Roy W. Vival, chief engineer of the O'Sullivan Rubber Corporation, Winchester, Va., reports: **"We are extremely gratified by our Blue Brute 3½S Tilting Mixer, which has had two years of constant, severe use. It is extremely mobile, well constructed and performs excellently. Long exposure has not decreased its efficiency. The mixing cycle is fast and the mix consistently uniform. It is a pleasure to endorse and recommend this equipment."**

FOR TRANSIT MIXING. President Bob McCorkle of the Abilene, Texas, Concrete Company, gives his reasons for re-ordering Blue Brute Hi-Up Truck Mixers: **"We have compared competitive makes on our jobs and find your Hi-Ups best in every way. Maintenance costs have been negligible. Just purchased your first chain-drive Hi-Up and find it even better than the older machines — faster charging and discharging, easier to maintain and smoother running."**

FOR PLACING. In building the Washburn vehicular tunnel under the Houston, Texas, ship channel, the "Trench method" of construction was used. The last yard or two of concrete placed in each of the section joints had to be placed *straight upwards* — a tricky pouring problem. Merritt-Chapman & Scott Corporation reports **an easy solution was found with the aid of a Blue Brute Pneumatic Placer, which performed excellently.**

Yes, among Blue Brute owners it's a never-ending story of more concrete at lower cost, trouble-free operation, time and money saved in every detail of mixing operations. Why not look into this proof that *there's more worth in Worthington?* See your nearby Worthington-Blue Brute Distributor, or write for bulletins on mixer types in which you're interested.

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C. & E. M. Photo
Ragnar Benson workmen dump buggies full of concrete to the north-wall forms. In foreground, a Mall vibrator.

A New Parts Depot Goes Up in the South

(Continued from preceding page)

16-inch swedge bolts that were set in sulfur. The steel framework was bolted together, lock washers being used throughout.

Around the outside wall of the office, 6 ⅝-inch Lally columns were erected on 20-foot spacing. The interior was supported by H-sections like the rest of the depot. The roof is of beam and girder construction. Beams are 14-inch WF 30-pound struts connecting the columns on the short or 22-foot side of the bays. The girders, 24-inch WF 76-pound, go the other or 40-foot way of the bay, and support the roof joists.

Joists are Ceco open-web 15-inch 167-pound joists with a span of 22 feet. They are welded to the supporting members on a 5-foot spacing across the 40-foot end of the bays. Over the joists goes a 2-inch poured gypsum roof slab, a 1-inch fiber glass insulation for the office and a 1-inch Insylite board for the warehouse area, and a 4-ply tar and gravel roof. In the office wing there is a suspended metal lath and plaster ceiling covered with acoustical tile.

Brick Walls

Above the floor slab rise red-brick walls, 4 inches thick, backed by 8-inch concrete block for a total thickness of 12 inches. For the depot itself Chattahoochee common red brick is used, while Hanley red face brick was laid on the office walls. The concrete block was supplied by Atlanta Aggregate Co., Inc. An estimated 191,000 common and 25,000 face brick were required. The exterior walls of the office wing are trimmed with stone. Inside the office, plaster is laid on the masonry interior walls, and for all exterior walls, on gypsum board lath ⅜ inch thick on wood furring strips.

Vertical clearance in the depot is 14 to 16 feet. The big structure is lighted by overhead lights, and heated by unit gas heaters. A sprinkler system is installed throughout the building, except in the office area, as protection against fire. The office wing is completely air-conditioned; the necessary equipment is on a mezzanine floor. The building contains lunch rooms for the convenience of those to be employed at the depot.

Personnel

The parts depot was designed by Fred V. Prather, Chicago architect. The builder, Ragnar Benson, Inc., was represented by J. H. Conroy, Superintendent, and Robert Conway, Engineer. W. L. Dunn is engineer in charge for the International Harvester Company. A force averaging 100 is employed on the construction.

Automobile Production Is Nullifying Road Program

Mounting automobile production—capped by the record estimated output of 700,000 units in May—is nullifying even this year's record highway construction program of $1,800,000,000, says Lt. Gen. Eugene Reybold, Executive Vice President of the American Road Builders' Association.

"Only vastly larger highway investments can possibly begin to cope with a situation which finds 32,000 motor vehicles produced each working day in a month." General Reybold feels the time has come to direct the ingenuity which made possible mass production of automobiles to ways to finance highways for their use.

The country's highway crisis is the "result of the inequitable distribution of the $30,000,000,000 spent annually on highway transportation", Reybold said. This imbalance, which finds 90 cents and more out of every dollar being spent on the vehicle and its operation, and less that 10 cents on the roadbed, must be adjusted. "The longer we delay adequate capital investments in our highways, the worse our traffic jam will grow, and the more we'll continue to waste in near-futile maintenance costs and extravagant vehicle operation costs."

Abbott, N. J. Road Chief

The New Jersey Senate has confirmed the appointment of Ransford J. Abbott, Secretary to Governor Alfred E. Driscoll, as State Highway Commissioner to succeed Spencer Miller, Jr. Commissioner Miller's resignation became effective July 1, when he took the presidency of the American International College at Springfield, Mass.

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Cleco's improved air-operated sump pump features a laminated gasket between the pump body and impeller plate so that clearances can be adjusted.

Air-Operated Pumps

An improved air-operated sump pump has been developed by the Cleco Division of Reed Roller Bit Co., P. O. Box 2119, Houston 1, Texas. The semi-screw-type impeller is designed to remove all but 1 inch of water from a sump or tank. Applicable for water removal from sumps, tanks, cofferdams, ditches, etc., the Cleco pump comes in a steel or bronze model.

The pump features a laminated gasket between the pump body and impeller plate so that clearances can be adjusted for wear. The front bearings are protected from grit and water by a special replaceable packing and seal. The pump has a 2½-inch discharge outlet and a capacity range from 340 gpm against a 10-foot head, to 124 gpm under a 70-foot head. Maximum operating head, according to Cleco, is 95 feet.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 103.

Dual-Fuel Engines

A new line of heavy-duty engines, power units, and generator sets which can burn either natural gas or diesel fuel is announced by Murphy Diesel Co., 5319 W. Burnham St., Milwaukee 14, Wis. Employing the same basic construction as Murphy diesel engines, the new Murphys permit operation on either fuel simply by positioning a lever.

The new engine utilizes high-compression combustion. Gas is fed to the engine through the air cleaner and intake manifold at about zero pressure. The vacuum of the engine delivers a full charge of air at every intake stroke, and the hydraulic governor-controlled gas valve admits the proper amount of gas. It is claimed this system insures an economical mixture of air and gas, always with an excess of air.

Ignition is accomplished by injecting pilot diesel fuel into the cylinder. The heat of compression ignites the gas-air mixture. A constant small quantity of pilot fuel is used (not over 14 per cent for extreme operating conditions Murphy says). If operation as a full diesel is desired for continuous diesel service, this change can be made without any additional parts. Three models are now available, ranging from 135 to 180 hp.

Further information may be secured from the company by requesting Bulletin No. 107. Or use the Request Card at page 16. Circle No. 102.

Construction Equipment

A new 36-page catalog presenting the complete line of Caterpillar power and earth-moving equipment has recently been prepared by the Caterpillar Tractor Co., Peoria 8, Ill. The literature illustrates, describes, and offers full specifications on the company's diesel tractors, motor graders, rippers, wagons, scrapers, cable controls, hydraulic controls, cable and hydraulically controlled straight and angling dozers, diesel engines, diesel marine engines, and diesel-electric sets.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 15.

Effect of Frost on Roads

A special committee established by the Highway Research Board got to work in 1947 to determine to what extent freezing and thawing weakens the normal carrying capacity of roads. The committee's first report in 1948 indicated that the loss in carrying capacity might be as much as 60 per cent while frost is leaving the ground.

The latest report, No. 10-D, summarizes research data gathered during 1949 and reviews the activities of the various states participating in the project. It also contains a manual of procedure for conducting the field plate bearing tests.

To obtain a copy of Research Report No. 10-D, address the Highway Research Board, National Research Council, 2101 Constitution Ave., Washington 25, D. C., and enclose 45 cents.

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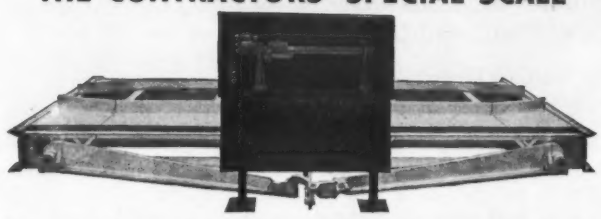

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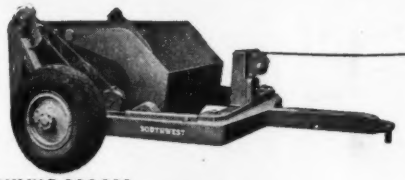

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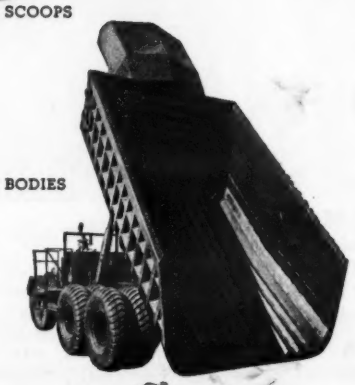

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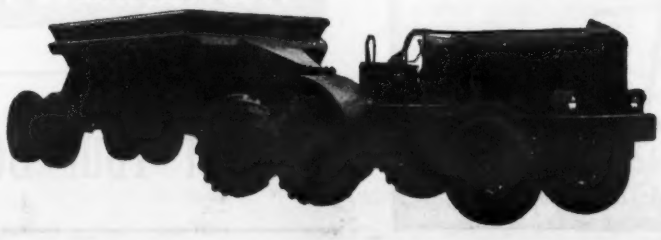

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✦ JACKSON County in southern Michigan differs from the usual run of counties in that its Road Commission maintains and operates 15 parks, ranging in size from 1 to 465 acres. This, of course, is in addition to maintaining a total of 1,510.5 miles of highways throughout the county, which has an area of 707 square miles and a population of 93,108. It includes 19 organized townships, 6 incorporated villages, and the city of Jackson, the county seat. Jackson, a leading railroad center of southern Michigan and an important industrial city, has a population of about 50,000. The rest of the county is given over chiefly to agriculture and dairying. The county seat is right in the center of the county which is almost an exact square in outline.

The grand total of 1,510.5 road miles that the Jackson County Road Commission maintains includes 149.56 miles of state trunk lines which are maintained under contract. Of this latter mileage, 77.76 miles are concrete, 62.12 are black-top, and 9.68 are gravel. The remaining 1,360.94 miles of county roads are classified as follows:

Concrete	20.67 miles
Black-top	390.05 miles
Gravel	787.79 miles
Dirt	162.43 miles
Total	1,360.94 miles

Road Improvements

Last year the Road Commission completed a substantial highway improvement program that included one short stretch of concrete paving; 20 miles of black-top surfacing; 23 miles of bituminous seal coat; and about 22 miles of regrading. The concrete project, just short of a mile in length, is of reinforced concrete, 20 feet in width and 8 inches thick. It is a heavily traveled road on the outskirts of the city of Jackson, with an original black-top pavement 25 years old. It was a Federal-Aid job, with Jackson County paying one-quarter of the cost, the township paying another quarter, and the Federal government taking care of the remaining 50 per cent.

Black-top work consisted of putting an oil-aggregate pavement, 22 feet wide, on some of the gravel roads. These jobs were scattered well over the county, and varied in length from ½ to 3 miles. The work was done by county forces, using hot-mix produced in the county's asphalt plant. These sections under improvement had been regraded and reditched the previous year. By permitting them to settle over the winter, the county detected any weak spots that needed repairs before the pavement was laid.

Bituminous seal coats were applied on pavements already black-topped, and did not necessarily represent additional miles of pavement. This work was done by county forces to a width of 22 feet. It usually consisted of either a shot of MC-5, 0.25 gallon to the square yard; or AE-200 asphalt emulsion, ⅓ gallon to the square yard. The bitumen was covered with 25 pounds to the square yard of crushed limestone or gravel.

Regrading of roads usually consisted of widening a gravel road from 20 to 26 feet, lengthening the drainage structures, and opening up new ditches. Additional gravel was spread over the roadbed to assure a base course 6 inches thick. Such work was handled by county forces throughout.

C. & E. M. Photo

Jackson County's asphalt plant is a gay spot on the landscape, with its Hetherington-Berner sections (left) a bright blue and its Pioneer sections (right) a bright red. Last year it served the entire Michigan county in three different locations.

Asphalt Plant

Oil aggregate for the new black-top paving work was turned out in the county's own asphalt plant, which was set up in three different locations during the course of the year in order to serve the entire county. Each site was near a gravel pit from which the aggregate was taken both for black-top and surface gravel operations. The county operates two Pioneer crushing plants, a 38-V and a 16-V, about nine months of the year. The 38-V unit was

(*Continued on next page*)

ROAD CLOSED

but not for long . . .

Fulco **COTTON CONCRETE-CURING MATS**

cure concrete quicker, better, cheaper

Concrete cured with Fulco Cotton Concrete-Curing Mats is all "set" to serve in 72 hours. Extensive field and laboratory tests conducted by the U. S. Department of Agriculture, prove conclusively that cotton concrete-curing mats cure concrete more effectively than any other method.

Fulco Concrete-Curing Mats stay wetter longer with less water (usually one wetting is sufficient), insulate against sudden temperature changes, thereby increasing curing efficiency and the subsequent flexural strength of the concrete. These water retaining and insulating properties save you time and money. Also, Fulco Mats may be used over and over again, making the cost per job negligible.

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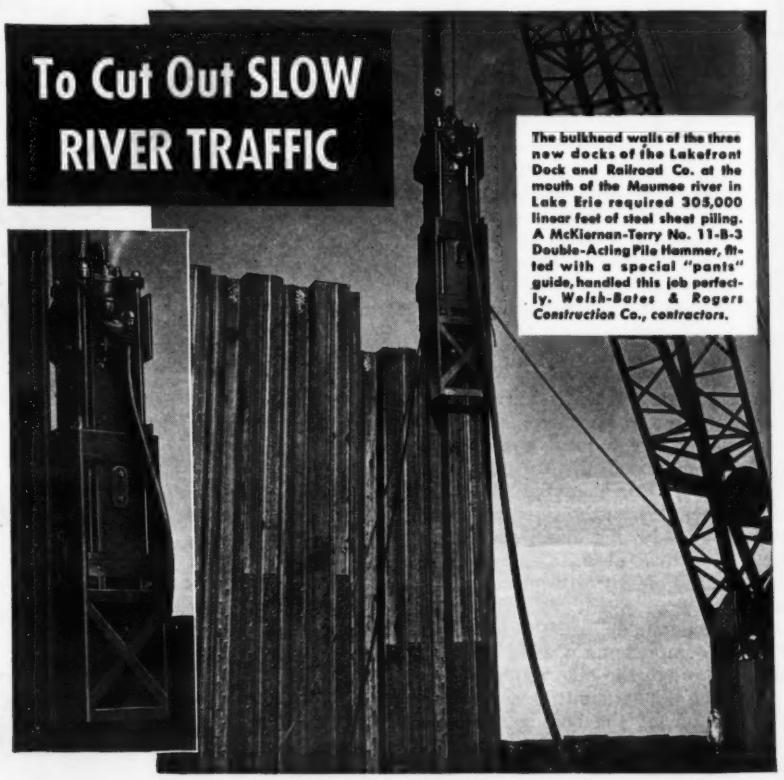

The bulkhead walls of the three new docks of the Lakefront Dock and Railroad Co. at the mouth of the Maumee river in Lake Erie required 303,000 linear feet of steel sheet piling. A McKiernan-Terry No. 11-B-3 Double-Acting Pile Hammer, fitted with a special "pants" guide, handled this job perfectly. *Welsh-Bates & Rogers Construction Co., contractors.*

These long-needed docks enable the lanky lake vessels to pick up coal loads right at the lake front, without the tedious, bridge-hampered trip five to seven miles up the river to Toledo, formerly necessary.

Fitted with a specially designed guide to insure accuracy, this powerful 11-B-3 McKiernan-Terry Hammer, packing a 19,500 foot-pound wallop, was the contractors' natural choice for handling the big steel sheets.

For engineers and contractors all know that the McKiernan-Terry standard line of ten double-acting and five single-acting pile hammers and two double-acting pile extractors can always supply a piece of equipment of the power needed for any specified pile-handling operation.

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☆ Let Your Dollars Fight Polio ☆

the busiest, turning out about 100 tons of crushed gravel an hour, and generally worked in conjunction with the asphalt plant.

A Koehring ¾-yard dragline fed gravel over the grizzly at the top of the receiving hopper on the crusher, which is operated by a Caterpillar diesel engine. After passing through the jaw and roll crusher, the aggregate was spilled over a triple-deck vibrating screen, with 100 per cent passing the 1-inch and from 95 to 100 passing the ¾-inch screen.

Another ¾-yard Koehring dragline fed the gravel to the asphalt plant, which was made up of a Pioneer mixing unit and a Hetherington-Berner drier 30 feet long x 8 feet in diameter. The continuous-mix plant produced oil aggregate at the rate of 100 tons an hour. County trucks hauled the material to the road where it was laid by a Barber-Greene Finisher in a single course 3 inches thick, in two 11-foot lanes. The county has 10 to 17 trucks hauling the hot-mix. Rolling was accomplished by a Galion 10-ton tandem roller.

On the seal-coat work, bitumen was applied either by a South Bend 1,000-gallon or a Roscoe 1,500-gallon distributor on Duplex trucks, while the cover aggregate was put on by two Buckeye spreaders. The stone was rolled in by the 10-ton tandem roller. Bids for the bitumen are taken in March for the coming year, and the successful vendors deliver the material in tank cars to the nearest railroad siding. The distributors pick it up at that point and haul it either to the asphalt plant or to the road being given the seal coat. The hot-mix contained about 4½ per cent of 100-penetration 70 to 80 per cent asphalt.

Park System

Of the 15 parks within the county, operated and maintained by the Jackson County Road Commission, many are located at large lakes offering bathing and boating facilities in addition to picnicking, camping, and other park recreation. Where camping is permitted, electric service is available and caretakers are on the premises. The largest of them all is the 465-acre Sparks Foundation County Park located in and adjacent to the southwest part of the city of Jackson. It was originally developed by the late Captain William Sparks, and given by his heirs to the county for use as a park. It contains an 18-hole golf course and the well-known illuminated Cascades.

The Cascades are a series of waterfalls and fountains on three different levels, with a total vertical height of 65 feet and a length of 500 feet. Water is pumped from a lagoon in the valley to the top of the Cascades through a 24-inch pipe, and returns by gravity through the pools, fountains, and falls. At night the spectacle is illuminated by an array of some 1,280 colored electric-light bulbs.

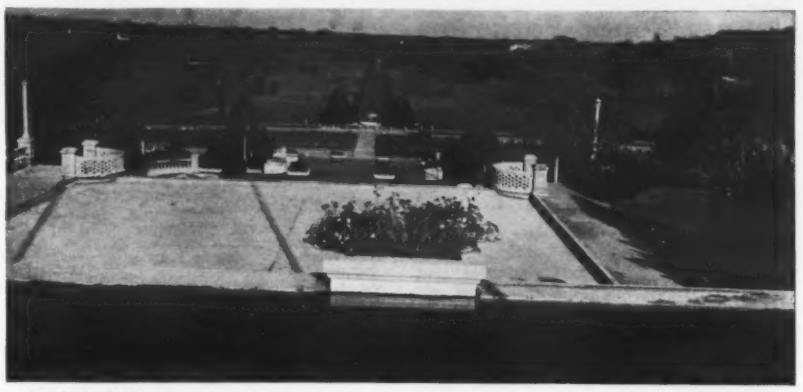
Commission Headquarters

At present, the headquarters of the Jackson County Road Commission are located on West Ganson Street in the city of Jackson in an L-shaped brick building. The long side, 180 x 60 feet, is a 2-story structure, while the shorter wing, 60 x 20 feet, is 1½ stories high. Offices are in the front part of the long wing, both upstairs and down. The rest of the upstairs area is given over to storage. To the rear of the first-floor offices are equipment-repair shops and truck-storage area.

All major repairs are done here to the some 130 pieces of motorized equipment owned by the county. This includes 90 trucks 1½ to 5 yards in size, 4 motor graders, scrapers, tractors, shovels, and mowing machines. Six other garages are spotted throughout the county, but these are used mainly for storage purposes.

Here are stored the materials used in winter maintenance—sand, calcium chloride, and rock salt for ice control. Snowfall in these parts averages 40 to 50 inches a year, and the snow is removed without too much trouble by steady work with the plows. Ice gives much more trouble, or a light fall of snow which gets packed down quickly and freezes. When the temperature is 10 degrees F and over, rock salt is used to advantage. It is followed by the plows or blades to scrape off the loosened ice. When the temperature drops below 10 degrees F, a mixture

(*Concluded on next page*)



C. & E. M. Photo

As Jackson County tourists will, we stop for a moment at the Cascades in Sparks Foundation County Park. This is the largest—it is 465 acres—of the 15 parks which are maintained by the County.

JAHN TILT TRAILERS — ideal for transporting tractors, dozers, rollers, compressors, loaders, etc. One man operation . . . no jacks or loading ramps required. Positive, automatic safety lock for platform.

FEATURES TO CHECK IN BUYING A TRAILER

• Gooseneck section especially designed with ample safety factor to withstand all stress and strain. • Deep, wide flange main beams run full length of trailer, rigidly crossbraced and electrically welded • Equal brake pressure on all wheels through individual wheel cylinders • Full range of sizes with any wheel or axle combination, quickly convertible from semi to full trailers with converter dolly.

Fast, Safe, Economical with JAHN *Heavy Duty* TRAILERS

THE operator who gets his equipment to the next job in a hurry is the one who realizes a profit at the end of the season! You're "on *your* way" to profit when you use rugged Jahn Trailers to save time between jobs. They are dependable, safe and economical on the road. Smooth, reliable brakes under all conditions. Rigidly braced frame and extra strong gooseneck stand up under heavy loads. Sturdy construction means long service life with low maintenance cost. Safe transportation of expensive equipment is important.

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Only the Goldak Model 87 offers all these BIG features:
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GLENDALE 1, CALIFORNIA

County Tends Parks As Well as Highways

(*Continued from preceding page*)

of sand and calcium chloride is put on. All hills are generally sanded.

Organization

The Board of County Road Commissioners is composed of three men: G. A. Scheele, Chairman; H. W. Purdy; and L. M. Reed. They are appointed by the Board of Supervisors to 6-year terms which are staggered. They act in a dual capacity, both as commissioners of the entire county, and as superintendents of one of the three districts into which the county is divided. E. K. McAllister is County Engineer, assisted by L. A. Parrish. Employees total around 150 men the year around.

Present headquarters, built in 1916, are too small and inadequate for the size of the organization. Plans have been drawn and land purchased for a new shop, garage, and office to be built on a 15-acre site in the northwest section of the city of Jackson. Financing arrangements for the $180,000 improvement have not yet been worked out. A new metal 60 x 120-foot building has been erected on the new site, and is being used for storage.

Jackson County is one of the few counties in Michigan that maintains its own laboratory for testing materials used in construction or maintenance operations. Materials that are purchased are tested, as well as those that are produced by county forces, such as aggregate, plant-mix, etc.

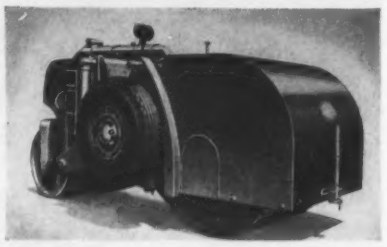
During 1949, the Road Commission spent a total of $809,910.77 on county roads and parks. Fourteen of the 19 townships during the year 1949 contributed various amounts of money for county road construction and maintenance. These amounts are included in the total expenditures for 1949 already mentioned. The largest source of revenue is the money from the weight tax on motor vehicles that is returned by the state to the county. The county also gets a small amount of funds from the gas tax, which includes the McNitt road allocation, an act that sets up contribution for the maintenance of township roads.

Retractable Wheels On New 5-Ton Roller

A new retractable-wheel roller, a portable and completely self-contained unit designed for road building and maintenance, has been developed by Huber Mfg. Co. of Marion, Ohio. The retractable-wheel design enables this 5-ton tandem roller to travel easily and quickly from one job to another. It uses its own power to raise and lower the trailing mechanism which is integral with its frame. While the roller is being towed, the rolls ride 9 inches from the ground.

The roller is powered by a 4-cylinder V-type air-cooled gasoline engine. Final drive is through a heavy-duty roller chain running on heat-treated sprockets. Hydraulic power for lifting or lowering the trailing wheels is supplied by a gear pump driven by an adjustable-tension V-belt from the engine crankshaft. Two hydraulic cylinders raise and lower the trailing wheels in response to a control lever near the operator's station. Spring-tension locking pins support the weight of the roller in traveling.

The trailing wheels are mounted on heavy plates parallel with the side frame. In traveling position, the roller is only slightly off balance toward the front, resulting in just enough lift on the tongue to permit smooth towing, Huber says. The bracket that joins the tongue and the roller permits pin-locking the tongue in two positions, one for low drawbars and the other position for higher hitches.



When the new Huber 5-ton tandem roller is to be towed anywhere, it lowers its own trailer wheels and its rolls ride 9 inches from the ground.

The steering rolls and yoke are prevented from pitching or rolling during travel by the use of two cargo straps, one on each side of the roller frame. When necessary, an adjustable stand supports the roller in a towing position before it is attached to a towing unit.

Further information may be secured from the company by requesting Bulletin No. T-143. Or use the Request Card at page 16. Circle No. 31.

New Roadside Tillers

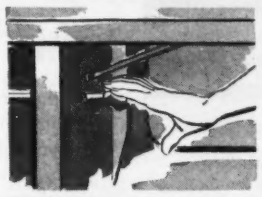
Rotary tillers suited to roadside-development work are made by the Milwaukee Equipment Mfg. Co., South Milwaukee, Wis. The line includes three power-take-off tillers, which can be attached directly to the power take-off of a Ford, Ford-Ferguson, Ferguson, or Allis-Chalmers WD tractor.

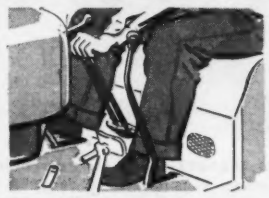
The Model FA-36 attaches directly to the tractor and is limited to units which have built-in power-take-off lifting devices. The Model WA-36 is a wheeled-chassis model drawn behind the tractor. The third model, the WA-48, tills a width of 48 inches. All WA models have their own hydraulic lifts and are mounted on frames with wheels.

These machines enable organic material such as straw to be incorporated to any depth. If it is desirable to hold the organic material close to the surface to lessen soil erosion, a simple adjustment of the depth-control shoe gives that result, the manufacturer says. The company also manufactures some handle-bar models for working in and around boulders, trees, fences, etc.

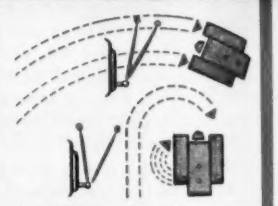
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 12.

CHAMPION
the NEW


Positive all-weather starting on gasoline, with quick change-over to full diesel operation, all from the seat.


Instant speed change up or down one speed, or stop, without declutching. Planet Power drive does it!

Separate reverse lever for quick change of direction. The tractor moves in the direction the lever is moved.


Planet Power steering puts turns with power on both tracks, feathered turns and pivot turns at your fingertips.

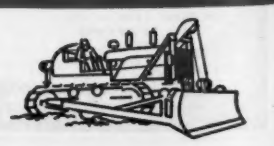
HERE ARE SOME OF THE CHAMPION'S EXCLUSIVE FEATURES

Self load and run with scrapers of 17-yard capacity—and shift gears on-the-go with the rolling load.

Cut waste shifting time out of work cycles; provide the best speed for every operation, 8 speeds in each direction!

Work on grades up to 100%. Its power, ground contact, balance and lubrication are right for licking any grade.

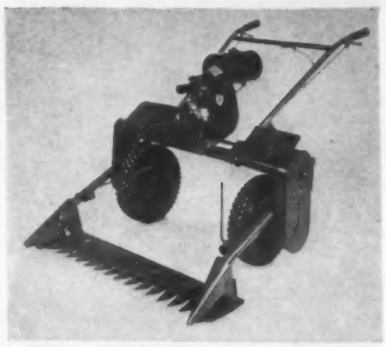
Handle heaviest loads on gradual turns as easily as straightaway because both tracks are powered in the turn!



Sickle-Bar Mower

A new sickle-bar mower for cutting weeds and grass on the roadsides is manufactured by Consolidated Industries, Inc., West Cheshire, Conn. Powered by a 2½-hp Briggs & Stratton gasoline engine, it provides a full 40-inch cutting width.

The mower has 2½-inch cutter blades with position adjustments for cutting heights of 1, 2, 3, and 4 inches. A planetary differential drive runs on antifriction bearings to both wheels. The mower has Alemite fittings throughout. Two dry-plate clutches with pistol-grip controls on the handle bars enable cutter bars and motive power to be operated together or independently. Thus the mower can be moved from one cutting to another under power without the cutter bar operating. A riding sulky and snow-plow attachment are available for use with the unit.



This new sickle-bar mower has a full 40-inch cutting width and can be adjusted to cutting heights of 1 to 4 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 101.

Vermiculite Institute Meets

Stanley K. Robinson of F. Hyde & Co., Montreal, Canada, was elected President of the Vermiculite Institute at the annual meeting held in Washington, D. C. W. J. Bein and E. R. Murphy were reelected Treasurer and Executive Secretary respectively. Standardization of bag sizes and contents on all major vermiculite products was approved at the meeting, along with a new research program for vermiculite concrete and plaster aggregates.

Surfacing Material To Protect Runways

A new surfacing material designed to protect airfield runways from the damaging effects of fuel spilled by jet planes was revealed on May 21 at Wright-Patterson Field during an Armed Forces Day exhibit. Developed by United States Rubber Co., Aero-Sealz is a solvent-resistant rubber compound which, when mixed with tar, produces a tough, durable surface that resists the dissolving effects of the kerosene-type fuel used by jet planes.

Damage caused by this fuel is a major problem in modern airport construction and maintenance, due to its lower rate of evaporation compared with high-octane gas used by regular planes. During normal operations, spillage from one jet plane may amount to 5 gallons from warm-up until take-off at the end of the runway. Due to the dissolving effect of the fuel, the bituminous pavement is eventually stripped from the upper layer leaving loose or free aggregates. Repeated spillage acts on progressively lower layers, with further disintegration taking place from weather, traffic, and vibration.

An additional hazard is the loose aggregates which are exposed to the terrific rear-end blasts of jet planes. These hard fragments may be blown in the direction of the air intake in front of another jet plane, or toward the revolving propellers of a plane moving or parked near by.

Further information about Aero-Sealz may be secured from United States Rubber Co., Rockefeller Center, New York 10, N. Y. Or use the Request Card at page 16. Circle No. 119.

Standard Replacement Point for Plumb Bobs

The National Bureau of Standards has announced that a number of manufacturers and distributors of precision plumb bobs have gotten together to work out a single design of replacement point. Extensive tests have indicated, they say, that the new design is suitable for all service requirements. This standardization is designed to enable easy replacement of the points by users throughout the country.

The stem of the standard point is longer than any now in common use. This is said to provide a suitable number of full threads by which the point is drawn firmly into place. A ⅜-inch body with a 10-32 stem and a 1/16-inch-diameter 60-degree conical tip were chosen for the standard. A through capstan hole obviates digging hard mud from a blind hole.

Copies of the "Proposed Commercial Standard for Plumb Bob Points", which contains several provisions as well as the proposed design, may be obtained from the Commodity Standards Division, National Bureau of Standards, Washington 25, D. C.

Hard-Facing-Alloys Data

An 8-page catalog on Wear-Arc hard-facing alloys has been prepared by the Alloy Rods Co., 7205 W. Market St., York, Pa. Its purpose is to acquaint the user with the basic hard-facing alloys manufactured by the company and the way they may be used to correct specific wear patterns.

Prime wear factors and combinations considered in the catalog include abrasion, impact, compression, corrosion, and heat. The folder suggests specific hard-facing alloys or combinations of them to meet various groupings of prime wear factors. It details the properties of each hard-facing, the welding procedure, typical applications, sizes, and identifying colors. Drawings illustrate applications.

This literature may be obtained from the company, or by using the Request Card at Page 16. Circle No. 81.

"There Is Nothing Like The TD-24. It Can Out-Push Any Tractor On The Job."

"Here is the Champion of Crawlers," owners will tell you, "the tractor that will pull down your dirt moving costs."

Contractors and operators who have observed or operated the new International TD-24 diesel crawler are spreading the news. Here is a tractor that out-works and out-performs every other crawler known to the industry!

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Regardless of what equipment you now use, visit your International Industrial Power Distributor and get a TD-24 demonstration. See for yourself what the TD-24 can mean to your operations in shortened time, reduced costs, extra profits.

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INDUSTRIAL POWER

Tune in "Harvest of Stars" with James Melton, Sundays, N. B. C.

State Betters Its Old Roads With Black-Top

Contractors Supply Material And Equipment, Department Forces Do the Work on 35 Maintenance Projects

✦ LAST year the Massachusetts Department of Public Works embarked on an extensive program of resurfacing old state highways. In general, the work consisted of laying a new wearing surface of bituminous concrete on existing pavements. It was financed by a state allocation of $1,000,000, which sum was matched with Federal-Aid funds. The 1949 program listed 35 projects in various parts of the state, totaling 50 miles and costing nearly $1,500,000. The work was done by department forces, while contractors supplied the necessary material and equipment. Projects varied in length from 1½ to 4½ miles, with the average around 1½ miles.

A typical project was a 3.36-mile improvement in the town of Amesbury on State Route 110, Haverhill Road, in the northeast corner of the state. Here, back in 1926, a two-lane concrete road was built. The following year it was widened to a three-lane road 30 feet wide. In the present betterment program the pavement was widened 3 feet on each side, and then black-topped for the full width of 36 feet. Labor on the widening operations was also done by state maintenance forces, with the contractor supplying the material. On this job the contractor was the John P. Condon Corp. of Watertown, Mass., and the cost was estimated at $81,330.

The contract included the furnishing of 12,000 tons of bituminous concrete and the equipment needed to haul the material to the job and to lay it in place. The black-top was mixed at the contractor's commercial asphalt plant in Dracut, Mass., a 25-mile haul from the job, where he has his own quarry, crusher, and a Cummer 1½-ton pug-mill plant. Hauling was done with a fleet of up to 20 trucks averaging 12-ton loads. Part of the truck fleet was hired, and part contractor-owned.

Widening

In the widening operations, state forces with a state-owned Galion motor grader scarified the existing shoulder, and then with a special drop blade cut out a trench 3 feet wide and 3 inches deep alongside the old pavement. This trench was backfilled with binder-course bituminous concrete. The material was dumped from the trucks onto the concrete pavement and pushed from there into the trench by the motor grader, where it was compacted by a Buffalo-Springfield 10-ton tandem roller.

The old pavement was next given a tack coat of AE-3 asphalt emulsion at an approximate rate of 0.1 gallon to the square yard. The bitumen was carried in barrels on a truck. A couple of men filled pails with the emulsion and spread it on the concrete with hand brooms.

Following that, a leveling course was laid with binder material, ranging in depth from 0 to 3 inches. A crown was shaped into the center of the highway with this initial course that feathered out to nothing at the edges. The material was laid by a Barber-Greene finisher.

Binder and Surface Courses

The leveling course was covered with a binder layer 1¼ inches thick, and this in turn was topped with a 1-inch surface course. The bituminous concrete was laid at a temperature of around 280 degrees F; the best results were considered to be attained when the material was held under 300 degrees F when being laid. The binder was put down in four lanes a little less than 10 feet in average width, while the surface course was laid in three 12-foot strips. In this way the longitudinal joints were staggered.

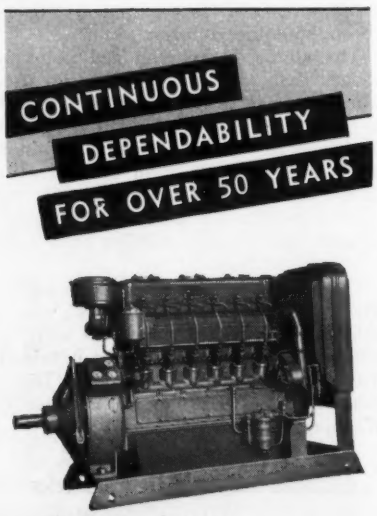
The contractor kept three Barber-Greene finishers on the job. One laid the binder, the second did the surface work, while the third was held in reserve as a spare. The binder was compacted by a Buffalo-Springfield 3-axle tandem roller, 12 to 15 tons, while the surface course was rolled by the lighter 10-ton tandem machine. From 500 to 900 tons of bituminous concrete, both binder and top, were laid in place during a 10-hour day.

The usual procedure was to have a finisher move along for about 1,200 feet on one lane, then move back to lay the same length of adjoining lane. If the edges of the joints became cold, they were painted with the AE-3 asphalt emulsion. As the work was done during the two last weeks in July when the weather was hot, no trouble was en-

(Concluded on next page)

C. & E. M. Photo

On a simmering July day, department men black-top a section of State Route 110 in Massachusetts. A truck with a Gar Wood body empties top-course material into a contractor-supplied Barber-Greene finisher.



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Lighting Plants from 350 watts to 25 KW., generates standard 60 cycle A.C. current, same as the High Line. A.C. Generators from 300 W. to 300 Kilowatts. Speeds of 720, 900, 1200 & 1800 RPM. Rotary Converters, single phase & three phase A.C. Motors.

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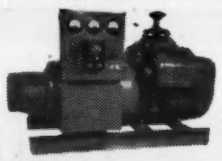

KATO ENGINEERING COMPANY
118 Maxfield Avenue
Mankato
Minnesota
U.S.A.

countered with joints becoming too cold.

The Mix

The leveling and binder courses of the same material contained stone with a top size of ¾ inch, while the largest stone size in the surface course was ¼ inch. The surface course also contained lime dust for filler. The bitumen used in both mixes was A-4 asphalt with a 100-120 penetration, supplied by the Colonial Beacon Co. of Everett, Mass. Batches of both courses included 0.5 per cent of Nostrip. Specification gradation requirements of both courses follow:

Sieve Size		Courses	
Passing	Retained	Binder	Top
1-inch	....	100	....
1-inch	¾-inch	0-10	....
¾-inch	½-inch	35-65	....
½-inch	....	....	100
½-inch	No. 4	10-30	20-60
No. 4	No. 10	5-15	10-35
No. 10	....	15-30	30-45
No. 10	No. 20	2-10	4-15
No. 20	No. 40	2-8	4-16
No. 40	No. 80	2-10	6-20
No. 80	No. 200	1-6	5-16
No. 200	.....	1-6	4-9
Bitumen		4-6	5-8

Typical 1½-ton batch weights of both courses follow:

Material	Binder Course		Top Course	
Sand	690 lbs.	23.0%	1,140 lbs.	38.0%
¼-inch stone	180 lbs.	6.0%	1,125 lbs.	37.5%
7/16-inch stone	135 lbs.	4.5%	480 lbs.	16.0%
Lime filler	.....	.....	60 lbs.	2.0%
¾-inch stone	1,860 lbs.	62.0%	.....	.....
Bitumen	135 lbs.	4.5%	195 lbs.	6.5%
Total	3,000 lbs.	100.0%	3,000 lbs.	100.0%

Personnel

On the paving, the single work crew consisted of seven men: foreman, B-G operator, roller operator, 2 rakers, and 2 shovelers. When the black-top work was finished, the state maintenance forces rebuilt the shoulders to an average width of 5 feet. The grading crew was made up of 2 foremen, 2 motor-grader operators, an air-compressor operator, and 18 laborers. A paving breaker was used for cutting out some of the joints, or removing small pieces of disintegrated concrete. In addition to the motor graders, the crew's equipment included three 5-yard trucks. Town police officers on the state payroll maintained traffic during the paving operations.

For the Massachusetts Department of Public Work, Charles B. Teague was Resident Engineer on the project assisted by Francis T. Hayes. Joe Baccari was Superintendent on the paving work. The DPW is headed by William F. Callahan, Commissioner, with Philip H. Kitfield, Chief Engineer. E. F. Copell is Executive Assistant of the Traffic and Maintenance Division.

Portable Seismograph For Construction Surveys

A catalog describing a new portable refraction seismograph designed for soil surveys on construction work has been released by the Century Geophysical Corp., 1333 N. Utica St., Tulsa 10, Okla. The seismograph may be used for determining the thickness of overburden and depth to bedrock in preliminary surveys on highway and foundation work.

The catalog includes a complete explanation of the seismic method for soil-strata determinations, as well as detailed descriptions and illustrations of the equipment. Components of the seismograph include the Century Model 404 oscillograph, the amplifier control unit, detectors, and the cable and reel. The entire unit weighs approximately 100 pounds, with the largest component not exceeding 25 pounds. The construction and lightness of the seismograph are designed to provide field mobility under adverse conditions and rugged terrain.

The literature points out that the unit may be used in conjunction with, or at times replace, other methods for soil surveys. It includes diagrammatic illustrations and a sample reproduction of the oscillogram; it explains that final determinations may be obtained immediately in the field, since the entire record is printed on daylight photographic paper; and it points out that the seismic method enables soil surveys to be made in metropolitan areas, under marshy or submarine conditions, in rugged terrain, and in areas inaccessible to core-drilling equipment.

This literature may be obtained from the company, or by using the Request Card which is bound in at page 16. Circle No. 73.

Two Joy Promotions

E. M. Platts, formerly Sales Vice President, has been elected Executive Vice President of Joy Mfg. Co., Pittsburgh, Pa. He succeeds the late Arthur S. Knoizen. Darrell Smith is now Manager of Distributor Sales. He has previously served the company as Sales Engineer, District Sales Manager, and Division Sales Manager in the southeastern states.

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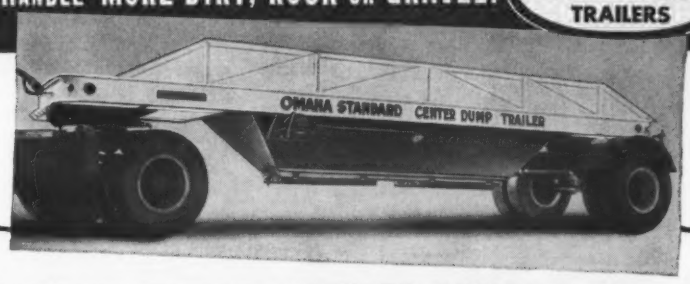

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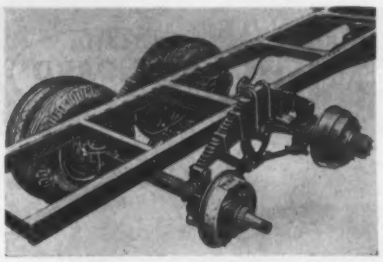

Little Giant trailing axles have been improved in order to increase strength and load capacity and to lower maintenance costs.

New Trailing Axle Ups Load Capacity

Improvements in its trailing axle designed to increase the load capacity of two-axle trucks have been announced by Little Giant Products, Inc., Peoria, Ill. Installation of the trailing axle, the company says, will almost double truck load capacity.

Oversized axles and heavier castings are augmented by completely rubber-bushed ends of the torque arms, designed to eliminate starting and stopping shocks. All parts are now 20 per cent heavier to provide a high safety factor. The use of rubber bushing at the torque arm ends eliminates four grease points for simplified maintenance. These improvements are effective on the Models B and C with load capacities of 13,000 and 15,000 pounds respectively.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 9.

Use of Rubber for Roads Featured in New Booklet

A new 26-page booklet describing the use of natural rubber in the top surfacing of asphalt roads has recently been prepared by Harry K. Fisher, Road Consultant for the Natural Rubber Bureau, 1631 K St., N.W., Washington 6, D. C. It summarizes the background of this new development and tells what has been done to date by the Bureau in cooperation with state and municipal highway departments in laying down stretches of "rubberized" roads.

Test sections laid in Virginia, Ohio, Texas, Minnesota, and in Canada, are described briefly and illustrated with photographs showing installation methods. Charts of skid-resistance measurements under various surface and speed conditions are given for pavements with and without a rubber additive.

Construction of this type of road in Europe, the literature says, and tests thus far performed on roads here in the United States indicate that the use of rubber in the surface will prolong the life of a road, reduce maintenance costs, resist the formation of ice, and offer a better tractive surface under wet and dry conditions.

The booklet "Stretching Highway Dollars With Rubber Roads" may be obtained from the Bureau, or by using the Request Card at page 16. Circle No. 7.

Economy in Handling Lube

A pocket-sized primer on industrial lubrication, titled "Eleven Ways to Cut Production Costs," is offered by the Alemite Division of Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, Ill. It is designed to help maintenance men show management how to reduce costs through simplified lubrication methods from barrel-to-bearing. The booklet presents eleven examples of production or machinery economies attained through modern handling and application of greases and oils.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 67.

Two-Way Mobile Radio

A new FM 2-way mobile radio unit for true adjacent-channel systems is now being produced by Motorola, Inc., 4545 August Blvd., Chicago 51, Ill. The compact unit is designated as the Uni-Channel Sensicon Dispatcher and is available for operation in the 25 to 50-megacycle or the 152 to 174-megacycle land mobile-service bands. The Uni-Channel is designed to provide full adjacent-channel operation as well as economic protection in the event of FCC split-channel allocations. The Sensicon receiver design allows easy adaptation to split-channel operation, the company says.

The radio has a rated RF power output of 12 watts in the low band and 10 watts in the high band. Models are available for operation from 6-volt dc or 117-volt ac primary power sources. The basic mobile package features a 3-unit type of chassis assembly installed drawer-fashion in a welded metal housing. Two versions are offered: the front-mount type allows complete permanent installation under any car or truck dashboard; the rear-mount version is provided for mobile trunk-mounted installations or where space is not available in the front compartment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 63.

New Rust Inhibitor

A new rust-inhibiting oil-base paint is offered by United Laboratories, Inc., 16801 Euclid Ave., Cleveland, Ohio. It serves as both rust preventive and finish coat in one application, and may be applied to damp surfaces as well as dry, the company says. Resistant to fumes, salt air, and weather, No. 425 paint may be applied either to new metal or to that which has already rusted. It comes in a choice of several colors.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 107.

Magazine in Conveyors

The Stephens-Adamson Mfg. Co., Aurora, Ill., which make conveyors, elevators, and transmission equipment for the supply or movement of aggregate and granular material, announces that its quarterly bulletin "The S-A Conveyor" is now available to the construction industry. This bulletin illustrates and describes in detail job installations of S-A equipment.

Those interested in obtaining the bulletin regularly should write on their company letterhead to Stephens-Adamson.

Lovewell at Pioneer

C. E. Lovewell has joined Pioneer Engineering Works, Inc., Minneapolis, as Sales Engineer. He will head a company program intended to expand sales and services to the lime and cement-producing industries.

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FAST Specially designed sawing blade and dies achieves fast cutting action. The hammer principle eliminates any special skill requirements.
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Trestle Takes Track Over Floodway Area

High Concrete Trestles and Embankments Built to Carry RR Tracks Well Above Water; Gantries, Job Workhorses

By WILLIAM H. QUIRK,
Eastern Editor

✦ IF and when the Department of the Army, Corps of Engineers, ever has to divert Mississippi River floodwaters down the Morganza Floodway in southern Louisiana, the Texas & Pacific Railway will no longer worry about its main-line track being covered with water. A new high-level crossing, 7½ miles long, has replaced the existing ground-level line between McKneely and Red Cross in Pointe Coupee Parish, northwest of Baton Rouge. The big railroad construction consists of two main-line concrete trestle bridges, 10,000 and 6,000 feet long, with high embankments between the bridges and at their ends.

Work on the $5,500,000 project got under way in May, 1948, and was completed this past spring. It is a regular flood-control project of the New Orleans District, Corps of Engineers. The embankment sections of the high-level crossings total 4½ miles and cost about $1,287,560. The long dirt fills were built between May, 1948, and December, 1949, by the Spencer Construction Co. of Carrollton, Texas. Erection of the remaining 3½ miles of trestle was done by Brown & Root Construction Co. of Houston, Texas, at a cost of approximately $3,933,345. Bridge work started in September, 1948, and was completed early this summer. Track construction, signals, communication lines, and the retirement of existing tracks and signals add about $550,000 to the cost.

The new line of the railroad is located about ½ mile south of the original route. On the east it begins near McKneely, about a mile east of the Morganza Floodway east levee, and runs northwest to the levee along the east bank of the Atchafalaya River at Red Cross. A bridge carries the railroad across the river to Melville on the west bank. The route across the West Atchafalaya Floodway has not been raised.

From east to west the improvement consists of first 10,000 feet of embankment, then a 10,000-foot trestle, followed by 9,700 feet more of fill, another bridge 6,000 feet long, and a 4,000-foot embankment at the west end of the project. Natural ground in this part of the floodway has an elevation between 25 and 30 Mean Gulf Level. The soil is mostly silt, deposited from river overflow, overlaying a sand stratum. The new profile averages around 29 feet above the ground; base of rail at the east bridge is 54.25 elevation, and 56.25 at the west bridge. Like the original route, the new line is single track but has a 1-mile-long passing track on fill between the bridges.

Trestle Section

Supporting the reinforced-concrete trestle are concrete H-type footings on 31-foot 3-inch centers. Each footing is 14 feet long, with the two sides on 13-foot centers. These sections are 6 feet wide and 3½ feet deep. From the base they go up vertically 1 foot 9 inches, and then batter in for the rest of their height to a riser block. The two riser blocks, one on each side of the footing, are 4 feet 10 inches x 3 feet 6 inches, and are from 6 to 12 inches in height. They serve as bases for the two columns.

Each bent footing rests on 18 untreated-timber foundation piles, 9 piles under each end of the H. Of the 9 piles, the 3 interior ones near the cross-piece are plumb, while the other 6 around the outside edge are battered. Piles project 6 inches into the footings.

Official Photo, New Orleans District, Corps of Engineers
Gantries were the real workhorses on Brown & Root's railroad-trestle job in Louisiana. Here gantry No. 2 places reinforcing steel for the T-beam slab of the trestle deck.

The two columns rising from the footing have a 2-foot 3-inch transverse width, and are battered in at the top 1½ horizontal to 12 vertical. Measured along the axis of the bridge the columns average around 3½ feet in width; both sides batter in to the top 1-5/16 horizontal to 12 vertical. Column heights, measured from top of footing to top of cap, are from 20 to 30 feet. Caps are 12 feet long, 3 feet wide, and 3½ feet deep.

The trestle deck is T-beam slab con-

(*Continued on pages 26 and 27*)

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Trestle Takes Track Over Floodway Area

(See preceding page)

C. & E. M. Photo
The rig which drove timber foundation piles for the T. & P. Railway trestle was built on a carriage spanning the footing trench and operating over the gantry tracks.

C. & E. M. Photo
The gantries—this one is pouring a concrete footing—straddled the trestle from track to track, a distance of 76 feet, at a height of 36 feet above the tracks.

C. & E. M. Photo
Cap and column forms for each trestle bent were in two sections, bolted together. Brown & Root built them in 1941 for a similar trestle job for the Missouri Pacific Lines.

C. & E. M. Photo
Third phase of the concreting was the T-beam deck pour. This gantry is preparing to move a steel form after a T-beam section has been poured.

Official Photo, New Orleans District, Corps of Engineers
In this close-up, the gantry places reinforcing steel for a T-beam section. Each gantry carried a Chicago Pneumatic compressor for operating vibrators, and 6 Beebe 5-ton hoists for shifting forms.

C. & E. M. Photo
Howard Payne, left, was Brown & Root's Superintendent for a time on the job. E. C. Ponder was Resident Engineer for the T. & P. Ry.

Trestle Takes Track Over Floodway Era

(*Continued from page 25*)

struction. It consists of two beams on 7-foot centers symmetrical about the center line, each beam 3 feet 1 inch deep x 2 feet 8 inches wide. The slab averages 12 inches in depth, and provides an 11-foot roadbed which is filled with 14 inches of ballast. The ballast is contained within a curb at one side and a 3-foot 8-inch walk on the other. In a typical cross section, the total width of superstructure is 15 feet 10⅝ inches. The 31-foot 2½-inch slabs are separated by a ½-inch thickness of Johns-Manville cork expansion-joint material.

A Gantry Job

The right-of-way had been cleared under a previous contract, so the first task confronting Brown & Root on the trestle construction was foundation excavation for the footings. In the contract this item totaled 47,000 cubic yards, but actually 170,000 yards was excavated to make a trench running the length of the structures rather than dig separate holes for each footing. Two Northwest 2-yard draglines opened up the trench which was 24 feet wide and from 8 to 9 feet deep. They started at the east end of the job and worked west, each machine averaging about 120 yards of dirt an hour.

As the draglines excavated, they cast the material out to the sides of the trench forming a roadbed embankment. Ties and rails for a standard-gage track were laid on each side on 76-foot centers; the gantry cranes operated over this during trestle construction. Another track was laid on the north side for hauling the materials of construction. All the major work such as driving foundation piles, setting forms and reinforcing steel, and pouring concrete was handled by gantry rigs.

Dikes were built across the trench at approximately 1,000-foot intervals. In this way a section was easily unwatered when working on the footings. The 10,000-foot trestle at the east end of the job was built first. When this structure was completed, the tracks were taken up and re-laid along the sides of the 6,000-foot bridge at the west end of the project.

Timber Foundation Piles

Untreated-timber foundation piles for the footings were required in lengths of 65 to 102 feet. Up to 74 feet, locally obtained yellow-pine piles were used. Over 74 feet, however, the piles used were Douglas fir, with 14-inch butts, shipped in from the forests of Oregon. They arrived by rail at the T. & P. siding on the job, and were brought out to the bents on the service track. An average of 4,500 linear feet of piling was driven by a single rig during a 10-hour work day.

The pile-driving rig was built on a carriage spanning the trench. It was supported at the ends on standard railroad flatcars operating over the gantry tracks on 76-foot centers. The steel leads were 115 feet high, and two moonbeams at the bottom permitted a two-way batter on the piles. On each side of the rig were two Beebe 5-ton hoists, or hand grabs, for moving the leads to give the proper batter. The leads and housing moved transversely across the carriage on rails placed at 20-foot centers.

U. of L. M. Photo
To keep the delivery haul of concrete to less than a mile maximum, Brown & Root set up a central mixing plant at the midway mark of the trestle project.

A 60-hp oil-burning boiler furnished steam for the Vulcan 50C hammer and operated an American 2-drum hoist. An American steam swinger, through a chain drive, moved the rig along over the rails. The timber piles were driven down through the thick blanket of silt 5 feet into the sand stratum to practical refusal. A flatcar was fitted out with a 2,000-gallon water tank and a 1,500-gallon fuel tank to service the pile-driving rig. It was pulled by a job locomotive.

Central Mixing Plant

For the construction of the 10,000-foot trestle, a central concrete-mixing plant was set up at the midway mark, thus keeping the delivery haul of concrete to less than a mile maximum. The plant was later moved and erected in a similar position when the 6,000-foot trestle was being built at the western end of the project. Siding tracks were laid as a convenience in unloading and storing material at the plant. Sand and gravel aggregate was shipped in from Gifford-Hill Co. at Alexandria, La., and either stockpiled or loaded directly into a Blaw-Knox storage bin. A Northwest crane with an 80-foot boom and a 2-yard clamshell bucket handled the

(*Continued on next page*)

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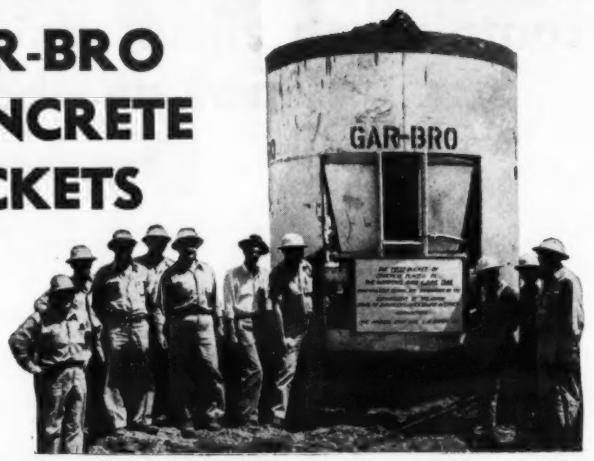

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Power-Cart handles 12 to 14 cu. ft. at 6 to 8 miles per hr. Turns in 4' radius.
Weigh Hoppers and Bin Gates in all sizes and types.
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Concrete Carts (6 Models) cap. 6 to 8 cu. ft.
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SIDNEY OHIO

Trestle Takes Track Over Floodway Area

(*Continued from preceding page*)

aggregate.

Lone Star portland cement came in bulk shipments from New Orleans, and was stored in two Brown-Bilt silos having a total capacity of 1,100 barrels. With a worm gear and a Link-Belt enclosed elevator, the cement was moved either to the silos or to one of the compartments of the aggregate bin at the top of the mixing-plant tower. From there the materials for the concrete entered the drum of a Smith 2-yard tilting mixer on a lower platform. Water for the concrete came from a deep 190-foot well at the plant. A 2½-inch pipe, with another ¾-inch pipe inside this casing, was sunk to the depth required. Compressed air was blown down the smaller pipe, thus forcing the water to the surface. It was stored in a 10,000-gallon elevated tank.

Batches were mixed for 1½ minutes, then discharged into Heltzel 2-yard concrete buckets sitting on flatcars on the track below. Usually four buckets were placed on a car, but on long hauls only three were carried so as to lose no time in getting the concrete to the forms. The specifications required that the concrete be placed in the forms within 20 minutes after the water was added for mixing.

The weights of a typical 12-bag or 2-yard batch of concrete, to which the water had been added at the rate of 5¾ gallons to the bag, were as follows:

Cement	1,128 lbs.
Sand	2,210 lbs.
Gravel	4,545 lbs.

Rolling Equipment

All materials, of course, were hauled over the supply track running the length of the job—a narrow strip of right-of-way cut through the thick woods of the Louisiana lowlands. Two flatcars carried the buckets of concrete, so that while one was being unloaded at the forms, the other was being filled at the mixing plant. Each car was pulled by a Plymouth diesel locomotive. Another locomotive, powered by a Ford V-8 engine, towed cars used in shifting the work crews about the project.

An International UD-9 diesel engine drove another locomotive that hauled cars with such heavy material as piles and reinforcing steel 3,000 feet from the main line to the east end of the job, and then out the supply track to where it was needed. The reinforcing was supplied by the Sheffield Steel Co. of Houston, Texas. It was shipped to Baton Rouge, La., where it was bent to shape by Dunham & Wilson Co. and trucked to the junction of the main and supply track, and from there by job locomotive to the bents.

An all-around useful piece of equipment in the trestle construction was a Brownhoist 25-ton locomotive crane equipped with a 65-foot boom. The long trench had a tendency to silt up, so this rig was employed, with a ½-yard clamshell bucket, to dig each footing down to grade. It was also used in loading piles and reinforcing steel, also in stripping the footing and column forms.

Workhorses of the project, however, were the two gantry cranes that straddled the trestle 36 feet above the tracks which were 76 feet apart. Their steel framework was sturdily built with truss spans on which were mounted American 2-drum hoists driven by gas engines. One gantry had a 7,500-pound capacity, and the other 5,500 pounds. Both were self-propelled with V-8 gas engines. Each carried a Chicago Pneumatic 210-cfm air compressor for operating the pneumatic vibrators during the placing of the concrete. Each was also outfitted with six Beebe 5-ton hoists, mounted on the overhead platform, for use during the shifting of the T-beam forms.

Steel Forms

Steel forms, made from ¼-inch stock, were employed in the concrete work which was handled in three phases—footings, columns and caps, and T-beam deck pours. The forms were built by the Brown & Root Construction Co. in 1941 when the same contractor was doing a similar trestle job for the Missouri Pacific Lines on a high-level crossing of the floodway. The forms were easily erected and dismantled, since they were bolted together and no ties went through the concrete. Cap and column forms for each bent were in two sections. After they were bolted together they were carefully lined up by means of turnbuckles on cables that were secured to hairpins anchored in the adjoining footings. These two guys on each side held the forms erect during the pouring.

The T-beam form suspended between two bents had two cantilever beams projecting out on the sides at each end of the span. Hog wires from these beams tied in to the hairpins in the concrete footing underneath. A turnbuckle adjustment brought these forms to the proper grade. The assembled steel reinforcing cages for the T-beam forms were set in place by the gantry.

In all the pours, the lifting hook on the gantry picked up the concrete buckets from the flatcars, emptied their contents in the forms, and returned the empty buckets to the cars for a refill at the batch and mixing plant. Footing forms were kept on for 24 hours after a pour; column and cap forms for 7 days; and T-beam forms for 14 days. In order to maintain a constant pouring schedule, the contractor supplied himself with 6 complete sets of footing

(*Continued on next page*)

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The Mystic River Bridge, Boston, is paved with Darex AEA concrete to increase resistance to freezing, thawing, and de-icing salt action.

There is only one **Darex AEA,** and it is specifically approved *by name* in **ASTM C-175-48T** for air entraining cement.

Comparative tests in the laboratory and on the job prove that, regardless of imitative names and claims, there is no other air entraining agent for concrete as efficient as Darex AEA . . . no other that costs so little to use per cubic yard of quality concrete.

Darex AEA will not settle out. It can be used in any dispenser without clogging. It will not lose its excellent air entraining effectiveness even when subjected to freezing and thawing.

Darex AEA is in use everywhere on every type of concrete construction . . . and in ready mix and concrete products plants using every known type of aggregate.

Darex AEA is the world's leading air entraining agent for concrete.

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Runways, Patterson Field
West Virginia
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Center Hill Dam
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East Boston Express Highway
New York-New Jersey
George Washington Bridge
Illinois
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Portugal
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forms, 14 sets for column and caps, and 28 sets of T-beam forms. Telescoping pipe was used in the pouring of the column concrete. To permit the concrete to settle, an hour or two was permitted to lapse between the time the concrete was placed in the column forms and the filling of the cap forms.

Form Stripping

In stripping the T-beam forms, steel I-beams were placed lengthwise under the forms along each side. The entire form was then lowered on these beams by the gantry rig until it cleared the superstructure. It was then rolled out to the side by means of the grab hoists, as the gantry moved along over the rails to the next set-up. Alternate T-beam sections were poured first, with the gaps in the superstructure being closed later on. Each gantry rig was equipped with a Kohler light plant, since most of the form stripping was done at night.

Curing was done with cotton mats and water. Ground water was always available in the ditch, and was pumped out into a 2-inch pipe line which serviced the concrete sections being cured. One Chrysler 3-inch and three Domestic 4-inch pumps were available, either stationed in one place or mounted on flatcars for mobility. They served a dual purpose, either pumping into the pipe line, or unwatering a ditch section for a footing pour by pumping the water out over the side of the roadbed embankment.

Employing a force averaging 215 men, Brown & Root worked a 10-hour day, 6 days a week. The monthly production averaged 72 footings, 54 column and cap bents, and 54 superstructure spans. A footing contains 23 cubic yards of concrete; an average column and cap bent 15 yards; and a T-beam span 39 yards.

Quantities and Personnel

The estimated quantities in the trestle-bridge construction included:

Foundation excavation	47,000 cu. yds.
Untreated-timber foundation piles	650,000 lin. ft.
Footing and abutment concrete	12,050 cu. yds.
Shaft and cap concrete	8,390 cu. yds.
T-beam span concrete	20,210 cu. yds.
Reinforcing steel	8,602,700 lbs.
Handrail	16,014 lin. ft.
Bearings	871,000 lbs.
Damp-proofing	209,300 sq. ft.

Brown & Root Construction Co. was represented on the contract by Superintendent J. E. Thomson who succeeded Howard Payne. For the Texas & Pacific Railway Co., F. R. Naylor was Principal Assistant Engineer, and E. C. Ponder was Resident Engineer, in charge of the bridge construction. R. J. Gammie is Chief Engineer of the T. & P. with headquarters at Dallas, Texas.

High-Level Embankment

On the high-level embankment sections which the Spencer Construction Co. built for the railroad, nearly 3,000,000 yards of dirt were moved. The finished embankment is 25 to 30 feet high with a 24-foot crown for the single tracking; where the mile-long passing track was added, the top width was increased to 37 feet. From the crown down to the 15-foot level the side slopes are 3 to 1; below that grade they flatten out on 5 to 1, 15 to 1, and even 20 to 1.

All the material for the fills was taken from borrow pits. This entire area had been built up from river deposition, and the soil ranged from silty loam to silty clay. So that the ballast would bind to the top of the fill, a 3-foot layer of sandy material was spread over the crown. The sand was obtained from the battures of the levees along the Atchafalaya River. It was loaded into trucks and hauled an average distance of 3 miles to the job.

Dirt-moving was going on usually in five different locations at the same time with five separate equipment set-ups. They included:

1. A Marion 2½-yard dragline, 50-foot boom, and four bottom-dump 13-yard Euclids.
2. A Marion 3-yard dragline, 50-foot boom, and four bottom-dump 13-yard Euclids.
3. Five Gar Wood 14-yard scrapers pulled by Caterpillar D8 tractors.
4. Three Super C Tournapulls with Carryalls, snatch-loaded by a D8; and two LaPlant-Choate power scrapers push-loaded by an Allis-Chalmers HD-19 tractor.
5. A Caterpillar elevating grader with six bottom-dump 9-yard Euclids, and three 6-yard Koehring Dumptors.

Night and Day

The job got under way in May, 1948, slowly at first with the ground still wet from the rainy winter. It picked up in June, and by July 15 was in high gear with four of the five dirt-moving units working two 10-hour shifts. The combination with the elevating grader worked only the day shift. In four months' time the amount of dirt moved averaged 500,000 yards a month. By November 15, 1948, 2,500,000 yards of embankment were in place, with about 500,000 yards more to go. The job was then shut down for the winter because of the Louisiana rainy season and the wet nature of the soil. The equipment was overhauled during the winter months of 1948-1949. Operations were resumed in June, 1949, with a smaller equipment fleet, and the embankments were completed that October.

Material was obtained from nine different borrow pits which were dug to a depth of 5 or 6 feet. The cuts were not made deeper because of the high water table. Tank trucks were used sparingly because the borrow was usually moist as it was excavated. Tractor-scrapers with their set-up had hauls averaging 500 to 600 feet. Hauls with the speedy self-propelled rubber-tired equipment averaged ½ mile.

The dirt was spread in 8-inch lifts and compacted by sheepsfoot rollers. Each equipment unit was supplied with such a roller, pulled by either a D6 or a D7 tractor. On the spreading and shaping of the fills, and maintenance of the haul roads, the contractor had at his disposal 5 motor graders and 7 tractor-dozers. The graders were all Caterpillars—a 212, a 112, and three

(*Concluded on next page*)

Announcing

The New BLAW-KNOX CONCRETE BUCKET

for handling of low slump concrete containing large aggregates and air-entraining agents

MEETS ALL THESE REQUIREMENTS

- Loads and discharges all concrete rapidly and completely
- Controllable discharge so that part of a bucket load can be deposited in one location and the remainder in another
- Air-operated discharge gates are positive and quick acting in opening and closing
- Buckets are equipped with hook-on attachments for crane or cableway, conveniently located for rapid attachment and detachment
- Buckets are light in weight yet sturdy enough to withstand the abuse encountered under construction conditions

HERE'S the new Blaw-Knox CAC Concrete Bucket, equipped with air-operated clam gates, and designed for high speed, economical operation on big-job specifications calling for coarse aggregate of 6" size, and air-entraining agents which make concrete more sticky than normal. The model CAC Concrete Bucket is specifically designed for low cost handling and placing of this harsh, low slump concrete for mass concrete construction on U. S. Engineer, Bureau of Reclamation, etc., projects. Exclusive Blaw-Knox features include: larger water level capacity; larger discharge openings; faster air-operated gates; rectangular discharge openings (instead of circular) to prevent arching of the harshest, lowest slump concrete over the discharge throat. Model CAC Concrete Buckets are furnished in 2, 3, 4 and 8 cu. yd. sizes. The 8 yd. model is supplied either as a two compartment or single compartment bucket.

Write for Bulletin 2331 for full information, specifications and dimensions.

A COMPLETE LINE OF BLAW-KNOX CONCRETE BUCKETS

ROLLER GATE CONTROLLABLE DISCHARGE BUCKETS

The roller gate design greatly increases gate operation efficiency under full load conditions, permitting extremely large openings for discharge. These gates are tight, leak-proof buckets are easily and rapidly operated by one man and the discharge is completely controllable. Available from ½ to 8 cu. yd. capacity.

DOUBLE CLAM GATE BUCKETS

A low cost unit for handling concrete of normal consistency on general construction work, and especially adaptable to narrow form work. Operator can work the discharge gate lever while straddling the forms. Gate operation is easy and convenient. Furnished in ⅓, ¾, 1 and 1½ cu. yd. sizes.

THERE'S A BLAW-KNOX "COMPLETE PACKAGE" TO MEET EVERY CONSTRUCTION NEED

LOW cost concrete construction in a *one source* package! That's the Blaw-Knox "Complete Package" of construction equipment that makes 100% mechanization possible on every job. It includes Clamshell and Concrete Buckets of every size and type, Road Forms, Curb and Gutter Forms, Aggregate and Cement Batching Plants, Subgraders, Paving Spreaders, Finishing Machines, and a complete Ready-Mix Package with Truck Mixer Loading Plants and the Hi-Boy Trukmixers with the revolutionary Revolving Hopper. Ask for detailed information.

BLAW-KNOX

BLAW-KNOX DIVISION of Blaw-Knox Company
Farmers Bank Bldg., Pittsburgh 22, Pa.
Birmingham • Chicago • New York
Philadelphia • Washington • San Francisco

Trestle Takes Track Over Floodway Area

(Continued from preceding page)

12's. Dozers included 2 D8's, a D7, a D4, an HD-10, and 2 International TD-18's.

For the Spencer Construction Co., Charlie Estes was General Superintendent and also in charge of the day work. C. C. Hendricks was Night Superintendent on the dirt-moving. Daniel J. Wise was Engineer for the contractor.

For the New Orleans District, Corps of Engineers, the high-level-crossing embankment and trestle construction for the railroad was under the supervision of M. G. Chitty, Field Assistant with headquarters at Baton Rouge. Eddie Joffrion for the U. S. Engineers and A. L. Nixon, Assistant Engineer for the T. & P. Railway Co., were inspectors in the field. The New Orleans District is headed by Colonel Charles G. Holle, District Engineer.

The TwinDual Gravel King features three stages of crushing with scalping-screen feed.

New Portable Plant Scalps and Crushes

The portable TwinDual Gravel King, recently developed by Universal Engineering Corp., Cedar Rapids, Iowa, features three stages of crushing with scalping-screen feed. A prescreening operation sizes and removes natural sand and gravel. Large boulders, often rejected in gravel operations, are scalped to the large-opening primary. Material which requires secondary reduction is by-passed to the TwinDual roll crusher for the second and third stages of crushing. All chips can be produced, or finished material from the scalping screen may be blended with crushed material from the plant.

The unit is also designed for conversion to quarry operation in the field. An apron feeder is interchangeable with the scalping screen for quarry rock. The Gravel King is made in two sizes. The Junior has an 1824 roller-bearing jaw crusher, 24-inch TwinDual secondary roll, 3 x 8-foot 2½-deck gyrating screen, 3 x 6-foot 2-deck gyrating scalping screen, and swivel feed conveyor. The Senior has a 2036 roller-bearing jaw crusher, 30-inch TwinDual secondary roll, 4 x 10-foot 2½-deck gyrating screen, 4 x 10-foot 2-deck gyrating scalping screen, and swivel feed conveyor. The complete plant operates from one power unit.

Further information may be secured from the company by requesting Bulletin No. U-501. Or use the Request Card at page 16. Circle No. 28.

Kern Heads Winslow Sales

On May 15, W. Ray Kern assumed new duties as Sales Manager of Winslow Engineering Co., Oakland, Calif., manufacturer of Winslow filters and elements. He was formerly Vice President and General Manager of Berglund Tractor & Equipment Co., distributor of Caterpillar tractors and P&H excavators.

Maj. Gen. P. B. Fleming Gets Transportation Post

Acting under powers conferred by Congressional approval of Reorganization Plan 21, President Truman has nominated Maj. Gen. Philip B. Fleming Under Secretary of Commerce for Transportation. In addition to the Bureau of Public Roads, the Department of Commerce now contains the Civil Aeronautics Administration, the Inland Waterways Corp., the Weather Bureau, the Coast and Geodetic Survey, and the new Maritime Administration, as well as a number of bureaus not mainly concerned with transportation. The Maritime Commission, which General Fleming recently headed, is abolished. Its regulatory functions are to be carried on by the new Federal Maritime Administration.

General Fleming is Chairman of the President's Highway Safety Conference and former head of the Federal Works Agency, which once included the Bureau of Public Roads, then the P.R.A.

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THE SUCCESSOR TO GREASE

In the past 90 days, over 600 cost-and-quality-conscious maintenance engineers have bought and now specify PLASTILUBE, the successor to grease. (PLASTILUBE is compounded with Warren 1-45 and BENTONE, a product of National Lead Company.)

Check these qualities of PLASTILUBE against the grease you are now using...

★ NEVER MELTS
★ LASTS LONGER
★ MULTI-PURPOSE
★ WATER RESISTANT
★ BETTER ADHESION
★ GREATER STABILITY
★ BETTER PUMPABILITY
★ COSTS LESS IN USE

You can benefit like hundreds of others—place your order today.

THE Warren REFINING & CHEMICAL COMPANY
CLEVELAND 15, OHIO

The Warren Refining & Chemical Company
DEPT. CE-2
CLEVELAND 15, OHIO
Rush my sample of PLASTILUBE
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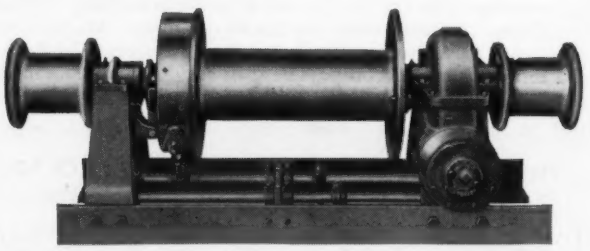
Our 50th Anniversary Year

PULL and POWER

Tulsa Winch models for all trucks from ½-ton up.

Tulsa Winches for all crawler tractors complete with transmission, line roller assembly and mounting brackets ready for installation.



To get the most work from your tractor or truck, install a Tulsa Winch. Available in 28 different models in capacities from 6,000 to 80,000 pounds, there is a Tulsa Winch for every construction job. Get in touch with your nearest Tulsa Winch distributor now or write direct to . . . . .

*Reg. U. S. Pat. Off.

Tulsa* Winch
TULSA, OKLAHOMA DIVISION OF VICKERS Inc.

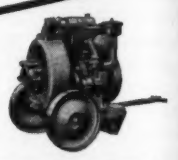
815-35 E. First Street

for low-cost pumping

JAEGER invites 5-way comparison with any other pump

1: Priming speed
2: Vacuum, capacity and pressure
3: Gallons water moved per gallon of fuel
4: Self-cleaning ability
5: Hours of service per dollar invested

Latest type 2" and 3": Compact heavy duty units with weather-shielded engines.



4" to 10" Portables: Specially housed for easy access to engines, larger fuel tanks.

Aluminum Pumps: with replaceable liners, stainless steel shell fitting. 1½", 60 lbs., up to 5700 gph.—2", 105 lbs., 9000 gph.

Jetting Pumps: For pressures to 275 lbs. Also 2" to 8" pressure pumps for supply work. Diaphragm pumps for sand and mud.

Ask for Complete Pump Catalog

THE JAEGER MACHINE CO.
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AIR COMPRESSORS • MIXERS
HOISTS • AGGREGATE SPREADERS
BITUMINOUS PAVERS
CONCRETE SPREADERS • FINISHERS

University Stages Roof-Raising

Literally, Concrete Floor and Roof Slabs of New Building Are Cast on the Foundation, Then Lifted Into Place

✦ STUDENTS at Trinity University in San Antonio won't have a chance to raise the roofs of their new buildings—it will have been done for them by the Youtz-Slick slab-lift building method.

We described the method in our May issue this year, on page 78. The accompanying pictures tell a follow-up story of progress on the 44,500-square-foot 2-story classroom and administration building which James Stewart & Co. of New York City is erecting.

As the pictures explain, the new technique makes it possible to cast floor and roof slabs without forms and raise them to permanent position with automatic power lifting equipment. New York architect Philip N. Youtz and San Antonio businessman Tom Slick conceived the technique independently of each other, and the Institute of Inventive Research developed and tested it.

Here's the significant piece of news. Low bid on the building based on conventional methods was $303,364 or $6.89 a square foot. The successful low bid based on the Youtz-Slick method was $279,364 or $6.35 a square foot. That means a saving to the owner of $24,000—or 54 cents a square foot—or 10 per cent.

The Technique

Here's how the method works. Building foundations are poured in place, then a base slab is poured. Columns of pipe, structural steel, or concrete go in and are anchored and grouted. The roof slab, or the second-floor and roof slabs if the building is two-story, is laid on the base slab as a bottom form.

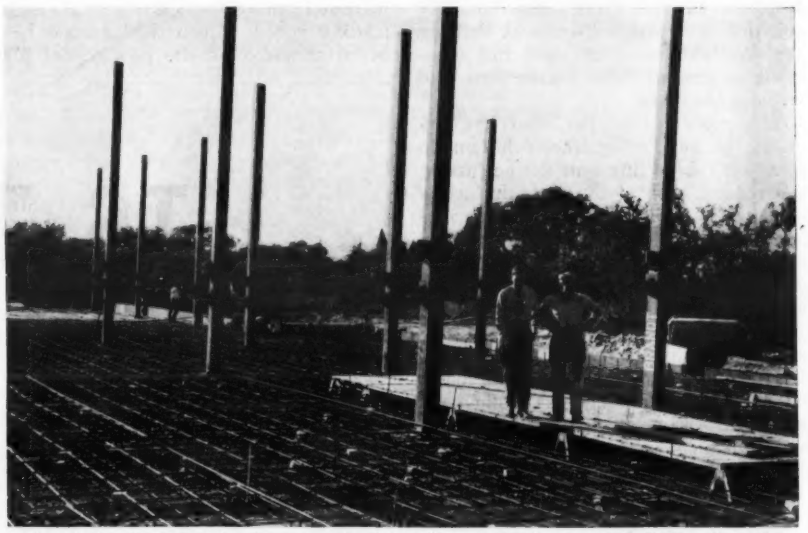
Concrete is then poured directly on the base slab over a separating medium and allowed to cure for at least 7 days. Specially designed lifting equipment is placed on the columns and attached to the slab. The slab is then raised to its permanent position and welded to the column by a collar placed in the slab at the time of pouring.

As the upper floors and roof are supported by the steel columns, bearing on no walls or partitions, those walls and partitions can be built of any material allowed under the building code, without reference to load-bearing strength. All partitions—and for that matter, exterior walls—can be movable and removable. The method is adaptable to multistoried construction.

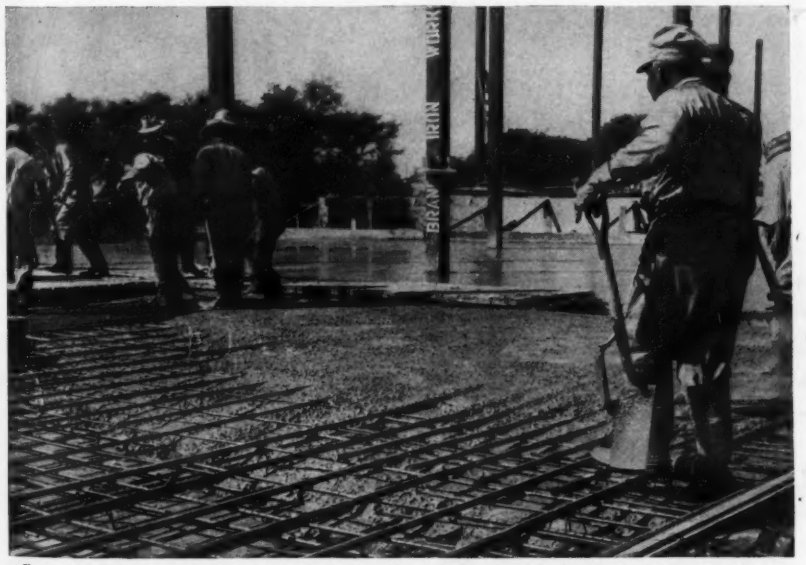
Consultants

Consultants working with the Institute to develop the method include, besides Youtz, Fred N. Severud, New York engineer; Alfred A. Gassner of Gassner Aircraft Engineering, New York City; O'Neil Ford, San Antonio architect; and engineers of Southwest Research Institute.

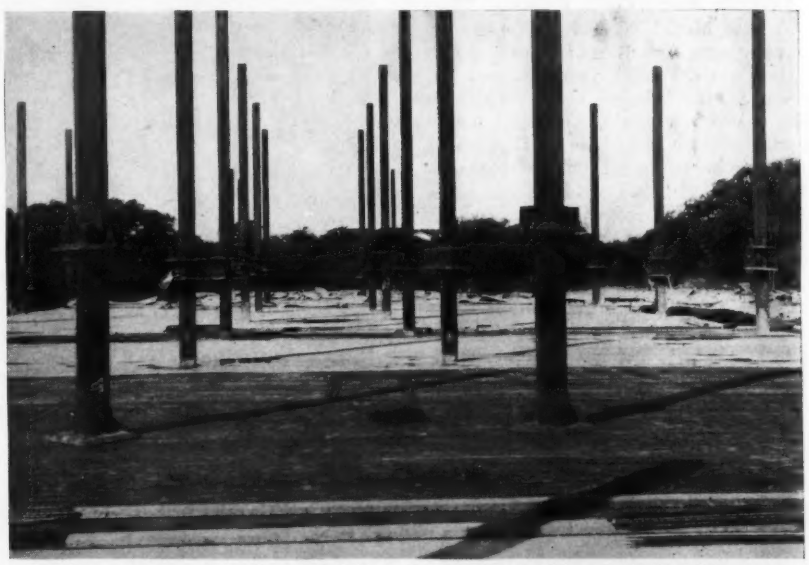
The new Trinity University administration building, shown here in the foundation stage, is on the highest point of the 107-acre new campus. The foundation is poured in place, then a base slab is poured.



The steel reinforcing for the concrete slab before concrete is poured. Notice the steel columns anchored in the slab. Special lifting equipment will be placed on these columns to raise roof and floor slabs to their permanent positions.

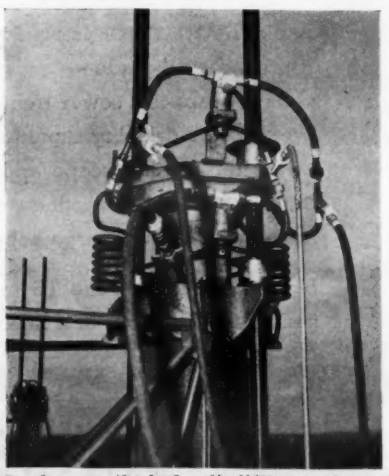


Concrete for the roof slab is poured over the reinforcing steel, using the base slab as a bottom form. Only special edge forms are required. Processed paper placed between the slabs prevents sticking.



For the purposes of pouring and lifting, the 385-foot building is divided into seven "panels". Here a roof slab is ready for raising on eight steel columns. Tension screws will connect hydraulic jacks on the columns with collars embedded in the slabs.

Here, in the center, a roof slab is in position ready to be welded to the column; the second-floor slab is still on the ground. At left and right, both roof slabs and second-floor slabs are already in place.



In close-up, the hydraulic lifting equipment fastened to the top of a column. The Institute of Inventive Research developed it.

Engineer Ken Hewitt of the Institute at the control panel of the hydraulic equipment. Average day's lift was 18 inches an hour.

Transformer Welder Has No Moving Parts

A new line of transformer-type ac arc welders which have no moving parts has been announced by Hobart Bros. Co., Hobart Square, Troy, Ohio. An electrically adjustable reactor eliminates the cranking method of setting welding current. Two models are available: the Model TSP-205-C, with power-factor correction, is rated for 200 amperes at 30 volts; the Model TSP-182-C, with power-factor correction and limited input for operation on REA lines, is rated for 180 amperes at 25 volts.

The five main taps of welding current, from low to maximum, are controlled by a hand-wheel switch. The rheostat control knob above this controls the amount of current flowing into the reactor to give 100 fine welding-current settings in each of the five main steps or ranges. Thus, approximately 500 different welding-current settings are available without changing electrode or ground-cable connections, and without cranking.

The rectified current also has the effect of regulating the relationship between the dc flux and the ac flux in the reactor core at the time the arc is struck, to provide a higher-than-normal current at the arc for a fraction of a second, Hobart says. This gives the operator an instantaneous striking arc without involving any moving parts.

By connecting the rheostat to the reactor circuit through a standard plug and receptacle, remote control is made possible on all models. A toggle-type line switch is provided on the control panel for disconnecting the transformer from the power line.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 125.

New 20-Yard Scraper

A new Model TC-170 tractor-drawn scraper with capacities of 17 cubic yards struck and 20 cubic yards heaped has been announced by the Wooldridge Mfg. Co., Sunnyvale, Calif. The new curved ejector and 65-inch apron opening have been engineered for faster discharge on all types of loads, the company says. Formed-steel construction is designed to offer high structural strength with trim appearance.

A three-piece cutting edge, together with the original Wooldridge principles of rear-draft fulcrum leverage and boiling bowl loading, is said to provide high loading speed. Ground clearance has been increased on the new model for maneuverability, while the cable arrangement has been re-engineered for stability, ease of control, and longer cable life.

The new Wooldridge Model TC-170 tractor-drawn scraper has a capacity of 20 cubic yards heaped, 17 cubic yards struck.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 80.

Compounds for Concrete

A 12-page illustrated booklet entitled "Fifteen Steps to Better Concrete Construction" has been prepared by Sika Chemical Corp., 45 Gregory Ave., Passaic, N. J., for consulting and construction engineers. It lists specifications of Sika compounds engineered to answer specific problems of concrete and masonry construction. It describes the use of Plastiment retarding densifier, designed to render structures resistant to water, cracking, and absorption, and to keep water content, concrete quality, and setting time uniform regardless of atmospheric temperature. The catalog also discusses 14 additional materials for coating, sealing, hardening, and repairing concrete and masonry.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 121.

DEEP TAMPING

MODEL TMH CONVERTED

Where specifications show a necessity of over 90% compaction on backfill tamping, R.P.B. equipment has the power and reach to do the job rapidly and permanently.

We also manufacture the MIGHTY MIDGET, a light machine driven by a 160 C.F.M. Compressor, which has proven itself very economical for breaking and tamping.

Write for information to Department "C"

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2751 EAST 11th STREET - LOS ANGELES, CALIFORNIA

T6 TRAXCAVATOR IS "One Man Band"!

This T6 TRAXCAVATOR'S tractor teammate carries a skull-cracker that breaks old slab. Next the T6 strips and truck-loads the broken concrete. No other piece of equipment can match the effectiveness of a TRAXCAVATOR on old pavement stripping — either concrete or blacktop.

A big TRAXCAVATOR is always profitably busy. It prepares subgrade — excavates for new culverts — back-fills sewer trenches — sprints all over the job dressing shoulders, shaping driveways, helping landscape and clean up. TRAXCAVATORS also help produce, stockpile and load aggregates — and charge hoppers.

Big TRAXCAVATORS, the T6 or T7, can thriftily handle the functions of a fleet of large, limited-duty machines. Lively, tractor-powered "crowd" on the TRAXCAVATOR'S bucket, enables digging and excavating tough clay or frost; loading shot-rock!

The T6 and T7 are *unit engineered* to match "Caterpillar" D6 and D7 tractors in capacity, low upkeep and long life. The 5 TRAXCAVATOR Models (1/2 to 4 cubic yards capacity) provide the only complete tractor-excavator line — give you a size choice for every job and purpose.

Ask your TRACKSON-"Caterpillar" Dealer to recommend the unit that fits your needs, or write direct to TRACKSON COMPANY, Dept. CE-70, Milwaukee 1, Wisconsin.

TRAXCAVATOR® The Original Tractor Excavator

Portrait in Print

By Ray Day

Today, It's Know Your Business, Or Else, Says Fred Heldenfels, Jr.

✦ WHEN the vestry of the Corpus Christi Episcopal Church recently got ready to build a beautiful new place of worship, it was not concerned about who would look after the important new construction.

"We'll get Fred Heldenfels," said a member. "He knows construction and contracting inside and out."

That churchman, although he was letting Heldenfels in for a lot of extra work, was giving an accurate thumbnail sketch of one of Texas' outstanding young contractors. As a partner in the Corpus Christi firm of Heldenfels Brothers, Heldenfels is primarily engaged in the highway end of the family business. Recently the Associated General Contractors of America decided that he knew the highway business well enough to become President of its Texas Highway Branch, a state-wide organization.

As a matter of fact, young Heldenfels has a theory about the parallel which exists between knowing one's business and getting along in the contracting game today.

"The average contractor is working with one of America's most rapidly changing industries," he explains. "It is full of variables and constants, both, generally, against him. Unless he gets plenty of accurate information about them, he's likely to have trouble."

The practical result of that belief is a load of extra work hours that never seems to end. Heldenfels takes all the time he can when he estimates a job to analyze its "variables" like materials, weather, and so on. These he balances against the "constants", such as wage rates, man-hour productivity, and so on, although they are constant only in degree. The result of all this is usually a low bid.

That is one of the minor points of disagreement sometimes between Heldenfels and his father. The senior Heldenfels sometimes points to the days when contractors got the job first, and then worried about how they'd come out. Today's contracting is different, according to the present generation of an illustrious contracting family. You have to be accurate and then some to be low and still make money.

Firm a Large Organization

Heldenfels Brothers is doing all right with that approach, too. It is one of the biggest highway contracting firms in southern Texas. It does drainage and sewerage work, airports, subdivision development, materials production, oil-well speculation, and it bids on dams. The firm has two gravel plants, two caliche-base plants, two commercial shell dredges, and a new hot-mix asphalt plant. Its equipment operates generally south of a line drawn through Houston and San Antonio. Its equipment outlay is staggering.

The organization has come a long way from its start as a shipbuilding company in World War I. But it still maintains a yard and office at Rockport, where F. W. Heldenfels, Sr., started the firm.

Today's operations are so big that they take all the time of the entire family. The senior Heldenfels is still very active so far as policy matters go. Actual operations are presided over by his three sons. The highway construction division is the province of F. W. Jr., the subject of this piece. H. C. Heldenfels handles much of the city work connected with sewers, and James R. handles the shell dredging and marine work.

C. & E. M. Photo

Fred Heldenfels, Jr., one of Texas' outstanding contractors, is a partner in the firm of Heldenfels Brothers.

A Busy Man

Young Heldenfels is undoubtedly one of the busiest contractors in Texas. His business takes full time, and yet he manages to make several trips a month over the state. Last year he made three long trips over the United States, in his connection with the AGC. He is a key member of the Lions Club, the Corpus Christi Country Club, Past-President of Corpus Christi A. & M. Club, and is a vestryman of the Episcopal Church.

He graduated from Texas A. & M. in 1933, just in time to see the firm pass through one of the most critical periods of its existence.

"We had our share of headaches then," he says, "just like we're having them now."

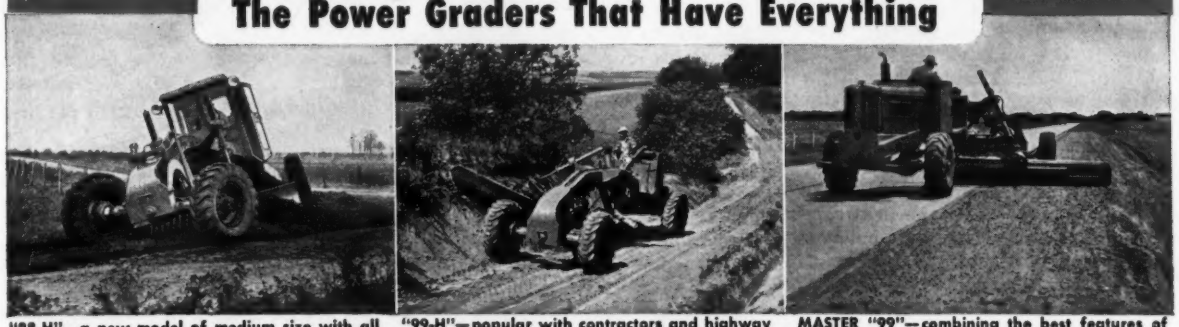
Young Heldenfels believes today's competitive cycle is a repetition of what he saw when he first entered the contracting business.

He has heard his father tell about still another similar condition shortly after the first World War. He has listened to many reasons for today's cut-

(*Concluded on next page*)

BUILT TO OUTPERFORM

The Power Graders That Have Everything



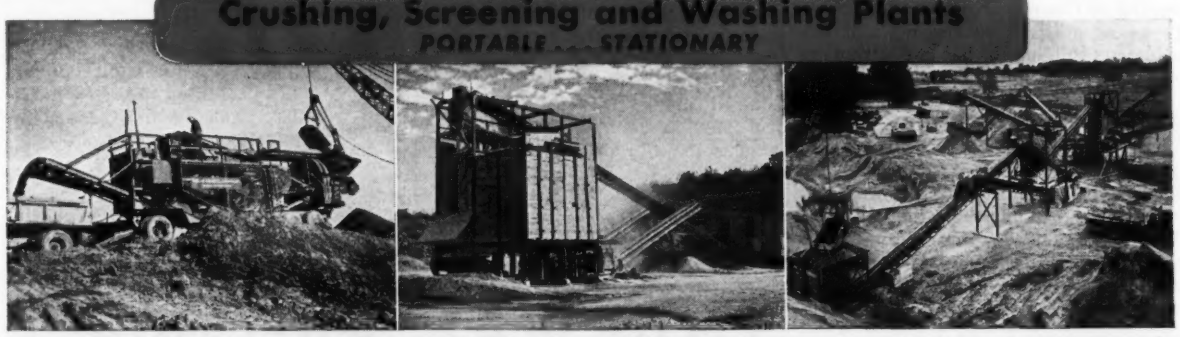
"88-H"—a new model of medium size with all the extra traction and maneuverability of All-Wheel Drive and All-Wheel Steer.

"99-H"—popular with contractors and highway departments for its all around performance, under all conditions, in all seasons.

MASTER "99"—combining the best features of the "99-H" with the extra power, traction and road speed of its 100 horsepower engine.

Crushing, Screening and Washing Plants

PORTABLE . . . STATIONARY



The AUSTIN-WESTERN LINE includes Jaw Crushers and Roll Crushers in a wide range of sizes; plus matching screens, elevators, conveyors and bins. Exclusive features increase output, and reduce maintenance costs.

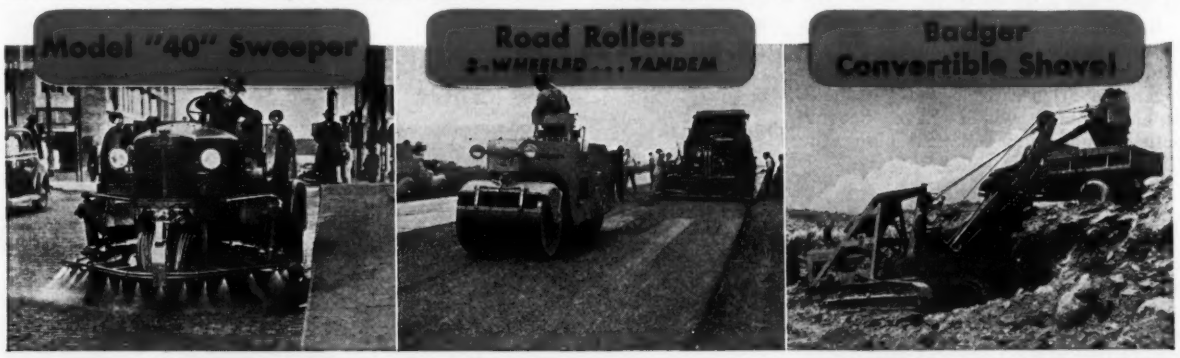
Skilled engineering characterizes each and every Austin-Western crushing, screening and washing plant, which is tailor-made for a particular production problem. We would welcome the opportunity to discuss yours.

Model "40" Sweeper

Road Rollers

3-WHEELED . . . TANDEM

Badger Convertible Shovel



Fast, maneuverable and economical. Dirt is thrown directly into the 2-yard hopper. Right-hand or left-hand gutter broom, or both.

3-WHEELED ROLLERS with hydraulic scarifiers. TANDEM ROLLERS of the variable weight type. All with gas or diesel engines.

The ¾-swing Badger wastes no power swinging extra weight; makes more swings per hour; can work in closer quarters.

Advanced engineering and honest construction characterizes each Austin-Western product. Your nearby A-W distributor will gladly recommend the one best suited to your needs.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

BUILDERS OF ROAD MACHINERY

Austin Western

SINCE 1859

STOP RUSTING VALVES

EXPENSIVE REPAIRS WITH SHEER SOLO-HOT

TRACTOR EXHAUST SHIELD

Die-cast aluminum. Adjustable for pipes up to 3¼" O. Dia. Keeps rain, dirt out of tractor. Money back guarantee. Order now! $1.70 postpaid.

Dealers Wanted—write for details.

H. M. SHEER CO. 114 SHEER BLDG. QUINCY, ILL.

No contractor has any leisure any more, says Fred Heldenfels. But now and then he manages to sneak a day for his favorite sport: deep-sea fishing.

Know Your Business Says Heldenfels, Jr.

(*Continued from preceding page*)

throat competition: too many new contractors, too many equipment distributors making it easy to get machinery, too many bankers making it easy to get money. He doesn't know for sure if it's one or all of these causes, but in the end he hopes it will be good for the construction business.

"A few new contractors will survive, and they will probably be the better ones," is his conclusion. So far as the outlook is concerned for the next several years at least, Heldenfels believes it will improve with the ever-increasing need for construction.

He explains that as fast as the firm develops a new subdivision and offers the building sites for sale, someone buys them. With more and more industry coming to Corpus Christi and southern Texas as a result of the oil and gas industry, Heldenfels has an optimistic view of the future.

Recently the company gambled about $90,000 on the future by purchasing a hot-mix asphalt plant. Heldenfels knew that asphalt and oyster shell makes a good pavement mix, but some way had to be devised to dry the mineral faster. With characteristic thoroughness, he studied all competitive makes and then settled on a new Cedarapids plant which had a huge drier of high capacity. Four natural-gas burners were installed to dry 100 tons an hour . . . even though tests showed the shell had 14 to 16 per cent moisture.

Heldenfels' thoroughness in studying this particular situation has put the firm out in front of its competition with regard to drier capacity on the shell-asphalt mixes which have become both popular and practical along the Gulf.

Finds Time to Fish

No contractor has any leisure time any more, says Heldenfels, but he manages to sneak a day now and then to indulge in his favorite sport: deep-sea fishing. His Chris-Craft cruiser is always tied in the Rockport boat house, ready to go.

He is a hunter, too, and tries to get his deer every season. One of his two sons, now 15, killed his first buck last fall. "It was more fun than getting one myself," Heldenfels said.

Several years ago he built his own home in Corpus Christi, where the family now lives. Like many another man in the construction business, he has to spend too much time away from home.

Preaches Cooperation

The old days when contractors and engineers were on opposite sides of a theoretical "fence" are over, he believes. Public construction today takes such a share of public money that contractors and engineers alike must work together to develop durable low-cost construction designs.

Heldenfels is one of the most enthusiastic boosters of that idea. At the recent Texas A. & M. Short Course at College Station, Heldenfels co-chairmanned a special contractor's panel with D. C. Greer, State Highway Engineer. Ways to improve the engineer-contractor relationship were discussed.

But there has not been enough mutual discussion of common problems, he believes. The idea has been a little slow to get started, but is gaining impetus all the time.

Much of Heldenfels' time these days is occupied with other highway contractors in a joint discussion of the general labor situation. Many Texas contractors are worried about future construction costs if a current labor movement to abolish the open shop is successful. This young contractor's thoroughness is again an advantage here, for Heldenfels has the welfare of the workmen, the contractors, and the public equally in mind. He realizes that the situation is complex, and is doing his best to arrive at a policy fair to everyone.

A Real Contractor

The way to tell a real contractor is to measure his love for his work. In that respect this typical contemporary-generation man measures up, with room to spare.

Asked what type of construction work he liked the best, Heldenfels didn't hesitate. "It's the tough jobs that have the worst problems that command your interest," he explained. "Highway work sometimes has such problems, but more and more I find myself liking some of this drainage and sewerage construction. The ground-water problem is terrific.

"On one job we ran into dry sand and then wet sand streaks, and had to use continuous shoring for approximately 8 miles of sewer line. Land here is so flat we went down 24 feet with this outfall line!"

Listening to the interest in his voice and seeing it in his expression, you have to mark F. W. Heldenfels, Jr., down as one successful young contractor who some day will be a successful and happy old contractor.

Stationary Compressors

A bulletin describing stationary precision-built compressors for supplying from 60 to 365 cfm has been prepared by the Jaeger Machine Co., Columbus 16, Ohio. The 8-page bulletin, JCS-0, presents six different models, giving dimensions, weights, operating details, etc., for each. It also describes the Packaged 60, a heavy-duty W-design compressor; pipe-line aftercooler-separators; and air receivers.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 5.

Use Safety-printed AJAX® Paper Drinking Cups

Contractors using AJAX Portable Drinking Water Tank and AJAX Paper Cups tell us they save man-hour cost and speed production. Workmen are protected from infections. Tank holds 5 gallons—AJAX Steel Dispenser holds 300 cups.

Every time he drinks from the clean AJAX Paper Cup he gets another reminder to *avoid accidents*. This is a personal message which he can read while he relaxes with a drink of water. It is the most effective and economical system yet devised because it does not require time-out for safety reminders. It also appeals to insurance inspectors and others. C-2

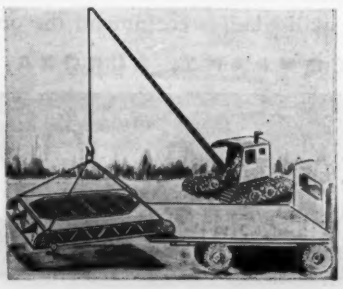
Send for latest bulletin with a list of Safety Messages. In addition to the famous AJAX Cups we offer the round AERO® and the flat COLUMBIAN® and PEERLESS.

UNITED STATES ENVELOPE COMPANY
Paper Cup Division
WORCESTER 5 MASSACHUSETTS

THURMAN *Portable* TRUCK SCALE

• **CAPACITY**
18, 20, 25 & 30 TON

• **PLATFORM LENGTHS**
18, 22 & 30 FEET



THE THURMAN PORTABLE TRUCK SCALE can be moved from job to job by removing 6 nuts which hold side arms in place. The rest of the scale can be lifted as a unit. Scale can be moved and readied for use in a few minutes as no adjustments are necessary.

EXTRA LARGE STEEL BASES support the scale, thus requiring no concrete footings. Scale furnished with Chrome-plated weighbeam—other vital parts are electro-plated to prevent rust and corrosion. Immediate Shipment.

Ask for information on other types including wheelbarrow scales, batching scales, and pit-type truck scales.

THURMAN SCALE DIVISION
156 NORTH FIFTH STREET COLUMBUS 15, OHIO

Services and Equipment For Construction Firms

A new 18-page booklet describes the design and building of special machinery for the construction industry, shipyards, dry docks, etc. It is issued by the Wellman Engineering Co., 7000 Central Ave., Cleveland 4, Ohio, engineering, constructing, and manufacturing firm. The booklet is a picture treatment of Wellman's line of specially constructed hoisting machinery, buckets, port and terminal equipment, steel - works equipment, aggregate-handling machinery, special cranes, and other products. It also points out that the company maintains an engineering department to study and determine the equipment design adapted to a particular problem.

This literature may be obtained from the company by requesting Bulletin 144, or by using the Request Card at page 16. Circle No. 95.

Catalog on ½-Yard Crane

A new 6-page folder describing the ½-yard Unit 614 crane has been prepared by Unit Crane & Shovel Co., 6411 W. Burnham St., Milwaukee 14, Wis. It details construction and mechanical features of the machine, particularly pointing up the turntable, hook rollers, lower structure, crawler frame, swamp cleats, automatic traction brakes, outboard bearings, and saddle block. Photographs illustrate the crane undertaking a variety of work. Drawings and charts show its working ranges and capacities used as a shovel, dragline, trench hoe, and crane. Complete specifications are included on the Unit 614's front-end attachment and trailer.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 136.

Hirschberg Set-Up Changes

Charles A. Hirschberg announces that the partnership of Samuel & Hirschberg has been dissolved and that the Streme-Liner aisle and traffic-line marking machines and power-machine sprayers will continue to be made at Dover, N. J., by Streme-Liner Mfg. Co. Mr. Hirschberg is the owner of the new company.

Catalogs on Tandem Rollers

Three new catalog sheets describing a line of tandem rollers are offered by the Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif. They feature the Essick Model 200 (1½ to 2 tons), Model 300 (2 to 3 tons), Model 400 (3 to 4 tons), and Model 500 (3½ to 5 tons).

These circulars illustrate each of the rollers in operation, indicate their principal features, provide detailed specifications, and describe the trailer that is provided for each. The rollers offer a pressure per linear inch of 60 to 200 pounds to meet most operating conditions.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 3.

Presenting the New

FEDERAL *Style* LINER SERIES

The Most Beautiful Trucks in America!

Here's the Truck . . .

THOUSANDS OF FLEET OPERATORS ASKED FOR!

In a nationwide survey, thousands of fleet operators confirmed the judgment and sound engineering back of the more than one hundred new and improved all-truck features built into the new Federal Style Liners . . . 30% greater strength . . . 60% greater vision . . . 100% greater accessibility . . . ultra smart styling . . . unrivaled beauty . . . massive appearance . . . extra wide and roomier cabs . . . unparalleled comfort . . . easier steering and new high standards of performance make these new Federals today's outstanding truck value. There is a large selection of Style Liner models . . . also a choice of several powerful high torque engines and wheelbases to economically master your hauling needs. Make a date with your Federal dealer now to drive a new Style Liner. It doesn't cost any more to own a new Federal—the truck that has everything.

FEDERAL MOTOR TRUCK COMPANY, DETROIT 9, MICH., U. S. A.

"I SAW MOTOR TRUCK HISTORY IN THE MAKING"

Says Lowell Thomas

Internationally known newscaster, writer and explorer.

Read his booklet describing the new Federal Style Liner trucks. Mail coupon below today for your free copy.

Federal Motor Truck Company,
Detroit 9, Michigan, U. S. A.

Send me a free copy of Lowell Thomas' booklet "I Saw Motor Truck History In The Making".

Name _____

Company _____

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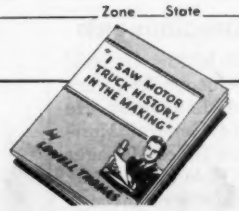


FEDERAL TRUCKS

The NCA Will Oppose Contract Separation

At an executive committee meeting in New York on May 12, the National Constructors Association announced that it will oppose separation of contracts in the construction industry. The association is composed of twenty of the nation's leading builders of oil refineries, steel mills, and chemical plants. Its opposition is directed against legislation requiring submission of separate bids, to the owner, on electrical wiring, piping, and other specialty work.

A resolution passed unanimously by the committee declared that "the passage of such laws would destroy the rights of owners and contracting authorities to freedom of choice in determining the most effective and economical method of accomplishing their construction work."

The statement of the NCA is an outgrowth of efforts in several states to pass such legislation. Legislation has been introduced at the current session of the Louisiana Legislature calling for all electrical contracts in excess of $10,000 to be divorced entirely from the general contract. This bill has the support of the National Electrical Contractors Association, and a bill similar in intent is being supported by organized groups in the plumbing industry.

In the Texas Gulf area, the Associated Plumbing Contractors of Houston and Harris County, Inc., is trying to put a similar program into effect on a voluntary basis.

J. F. Pritchard, President of the NCA, said that in his opinion it is not feasible to separate specialized functions from the overall function of the general contractor, for "It would result in making the owner responsible for coordinating all field work—a job which always has been and is rightly the responsibility of the general contractor. A change would produce nothing except a waste of time, money, and efficiency."

Moles Elect Officers

James F. Salmon, New York Manager for The Arundel Corp., was elected 1950-1951 President of The Moles, society of tunnel and heavy-construction men, at the organization's annual business meeting in New York last May. He succeeds Carlton S. Proctor, senior member of Moran, Proctor, Freeman & Mueser. Mr. Salmon worked on New York subway and other tunnel projects, and is now directing the dredging of a new pier site for the New York Central Railroad and United Fruit Co. at Weehawken, N. J.

At the same meeting, Ralph W. Atwater, who is The Moles' moving spirit, was unanimously acclaimed life Honorary President of the organization. He is General Manager of Shultz Dredging Corp. of Hoboken, N. J.

Other newly elected officers are Richard V. Hyland, of Madigan-Hyland, for First Vice President; David Bonner, of Frederick Snare Corp., for Second Vice President; Albert E. Downes, of Lehigh Portland Cement Co., for Sergeant-at-Arms; George P. Walker of Johns-Manville Sales Corp., for Secretary; and Howard P. Maxton, of Raymond Concrete Pile Co., for Treasurer. Following are the trustees: Jules R. Breuchaud, of Underpinning & Foundation Co., Inc.; Ralph DeSimone, of Merritt - Chapman & Scott Corp.; Thomas Walsh, Jr., of Walsh Construction Co.; and Robert H. Dodds, of *Engineering News-Record*.

Ryerson Steel Appointments

Thomas Z. Hayward is now General Manager of Sales for Joseph T. Ryerson & Son, Inc., steel distributor. He was formerly Assistant General Manager of Sales and Acting Sales Manager of the Chicago plant. Roland W. Burt succeeds him as Sales Manager there.

The construction or remodeling of a building in the downtown section of a city no longer means pushing pedestrians into the street, says E. J. Beinecke, Jr., of the Patent Scaffolding Co. Everyone—contractor, owner, neighboring property owners—has a stake in protecting the pedestrian with sturdy scaffolding and sidewalk bridges.

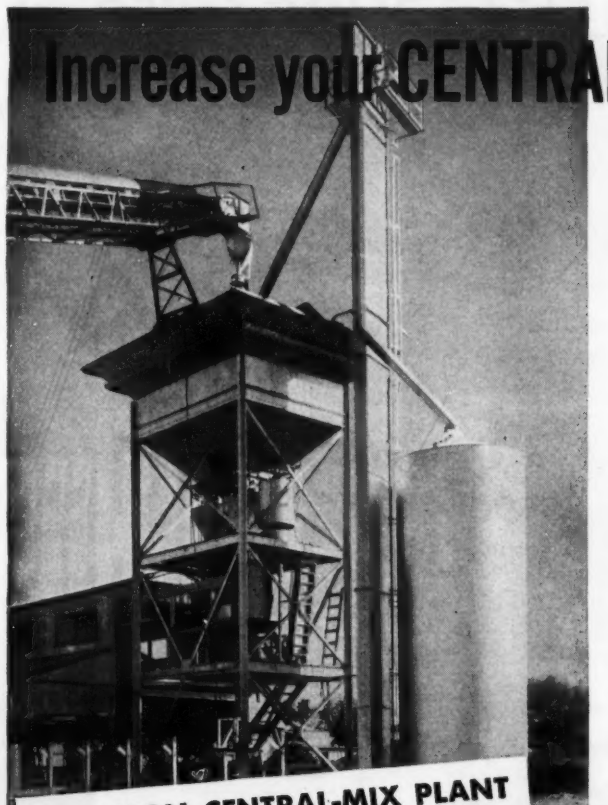
Protect Your Public

The building construction industry has a public whose protection is its responsibility. This public is made up of men who couldn't get tickets to the ball game and men who, to cheat the tedium of their eight hours at a desk, spend their lunch hours watching buildings go up or come down or be remodeled. It is possible that this public will come to include the ladies if flimsy wooden sidewalk bridges cease to menace their Nylons and high heels. Proper protection of these fans, not to mention mere passers-by, means proper scaffolding and bridges.

E. J. Beinecke, Jr., of The Patent Scaffolding Co., Inc., Long Island City, N. Y., reminds us that good scaffolding and good sidewalk bridges mean good public relations. A strong, workmanlike, steel walkway protects the public and creates good will. But a flimsy, shoddy structure becomes associated in the minds of irritated passers-by with the building or the contractor. Mr. Beinecke also says that since proper scaffolding and bridges do not detract from the appearance of the neighborhood, they are means of securing the good will of near-by property owners.

While good public relations is probably a sufficient reason for proper sidewalk protection, it is important to note that by protecting the public the owner or contractor also protects himself by putting a stop to sidewalk accidents and to the possibility of financial liability.

Increase your CENTRAL-MIX PLANT earnings

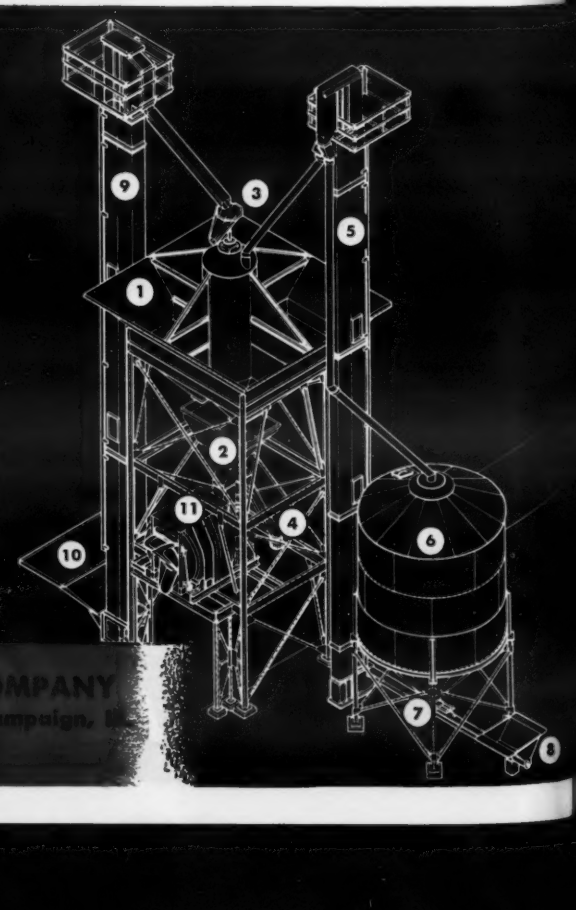


TO PROVIDE you with the most economical production of concrete, Johnson offers you today's widest selection of portable and stationary plants, all types, sizes and styles . . . engineered to *your exact requirements*. One typical example is the flexible Johnson Central-Mix plant illustrated here with Step-by-Step Bin. Also available are Johnson Octo-Bin plants that can be used with as many as 8 aggregate compartments, 150 to 3,000 yds. overhead storage, and 150 to 1350 bbl. capacities in central cement tank. Ask too, about Johnson Portable-Section, Welded Aggregate and Cement Bins for crane, elevator or conveyor charging.

Over 100,000,000 cu. yds. of concrete have been poured by Johnson-engineered Central-Mix Plants. This practical experience can save you time, money and increase your profits. Whenever you are ready to modernize your present plant or plan for new Central-Mix, Transit-Mix or Concrete Products facilities, it will pay you to write us, or call your local Johnson distributor.

JOHNSON CENTRAL-MIX PLANT GIVES YOU ACCURATE CONTROL . . . LOW-COST PRODUCTION:

1. This 120 cu. yd. Step-by-Step Bin is arranged for 4 aggregate compartments of 25 cu. yds. each, and has a centrally-located cement tank of 110 bbls. capacity.
2. Concentric aggregate and cement batcher, of 2 cu. yd. capacity, handles all 4 aggregates and the cement. (See photo on opposite page.)
3. Pivoted distributor, mounted at top of bin, feeds aggregates into any of the 4 compartments.
4. Charging chute can load dry-batch mix direct into trucks.
5. Cement bucket elevator has capacity of 300 bbl. per hour.
6. Single-compartment storage silo holds 945 bbls. of cement.
7. Screw-type cement conveyor has approximately 300 bbl. per hour capacity.
8. Hopper for receiving bag cement.
9. Aggregate bucket elevator.
10. Hopper for receiving aggregates from trucks.
11. Heavy-duty, non-tilting Koehring mixer, model 56-S, for accurate quality and high-speed mixing.



KOEHRING PRODUCT

C. S. JOHNSON COMPANY
Champaign, Ill.
(Koehring Subsidiary)

A New Asphalt Plant With Electric Drive

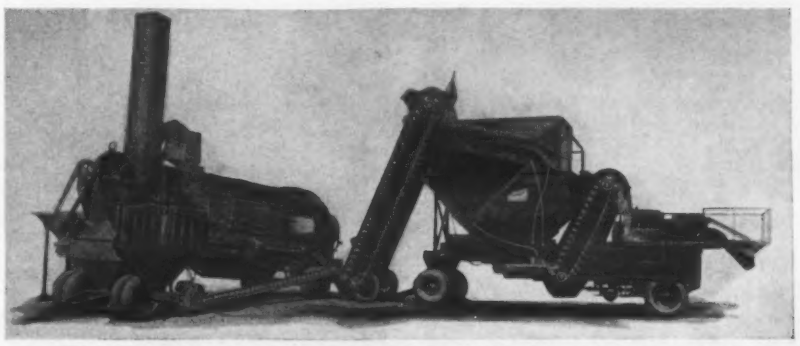
A new asphalt plant which has a rated capacity of 50 to 70 tons an hour and operates on the continuous-process principle has been developed by Pioneer Engineering Works, 1515 Central Ave., Minneapolis 13, Minn.

Designed in two sections, the Model 51 Continuflo plant has a burner, combustion chamber, drier, dust collector, and fan on one pneumatic-tired chassis, and a gradation screen, bin with three aggregate compartments, mixer elevator, pugmill, and truck-loading hopper on the other. The feeder and cold and hot elevators can be moved on their own wheels or loaded on a truck.

No erection work is involved in setting up the plant. Units are brought into place and are ready to go as soon as piping is attached. A steam- atomizing or an air-atomizing burner is available. With the latter, no steam is required at the drier, Pioneer says.

Individual electric motors drive each functioning unit. They are controlled from two push-button stations—one on the mixer platform, the other at the base of the drier. Motors are all totally enclosed and fan-cooled, and have high starting torque, the manufacturer says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 109.



Pioneer's new Model 51 Continuflo asphalt plant consists of two main units. No erection is involved. The units are ready to go on the job as soon as they are pulled or backed into place and piping is attached.

Cummins Regional Manager

Loyd E. Williams has been appointed Rocky Mountain Regional Manager for the Cummins Engine Co., Columbus, Ind. His headquarters are in Denver for the seven-state region: Utah, Colorado, Wyoming, South Dakota, Nebraska, and parts of Montana and Idaho.

A Steel-Cord Casing For Heavy-Duty Tires

A 4-ply tire with an all-steel-cord casing was developed by Michelin of France in 1932. It was launched in Europe in 1936 and in the U. S. in 1939. Because of the war its introduction in this country was stopped. Now an improved Metalic tire is being reintroduced in this country by the Tire Division of Michelin Corp., 341 E. 62nd St., New York 21, N. Y., for use on equipment when the going is rough. These new tires are said to have a high load capacity and a long service life, and to eliminate blowouts. They can be retreaded several times.

Michelin Metalic tires fit standard rims. They use tubes of corresponding sizes, but they are supplied with special flaps and with a protector consisting of a heavy liner made of soft rubber, pasted inside. Their special metal construction is designed to offer high resistance to cuts, ply separations, and impact breaks. Michelin points out that the tires run very cool because heat is dissipated through their thin walls; and that hot spots are eliminated due to the heat-conducting character of the steel cables. The Metalic tires may be retreaded or recapped in the conventional manner and with standard equipment.

Michelin tires are made in two types for contracting use. The zig-zag type (ZZ) is recommended by the company for trucks carrying heavy loads over long distances on hard-surfaced roads. The Y-type is for rocky roads, workyards, quarries, construction jobs, etc. Its carcass is particularly designed to withstand deep deflections and to resist wall bruises resulting from side impacts, rubs against posts or curbstones, etc. Its tread has more rubber than the ZZ-type and provides better traction and flotation on muddy or soft surfaces.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 1.

Booklet on Concrete Saws

A new 20-page catalog on Concut and Clean-Cut concrete saws is available from Concrete Sawing Equipment, Inc., 200 Union National Bank Bldg., Pasadena 1, Calif. The Clean-Cut, the booklet explains, is a lightweight saw for cutting depths between ½-inch and 2⅞ inches; the Concut cuts from 2 to 4¼ inches deep.

Complete specifications on the models, together with data on Concut Blue Blades and Clean-Cut Black Blades, are included in the catalog. All mechanical and operating features are pointed out, and on-the-job photographs illustrate applications of concrete-sawing equipment. A parts price list is included, along with instructions for servicing and operating both Concuts and Clean-Cuts.

This literature may be obtained from the company by requesting Catalog 11, or by using the Request Card at page 16. Circle No. 98.

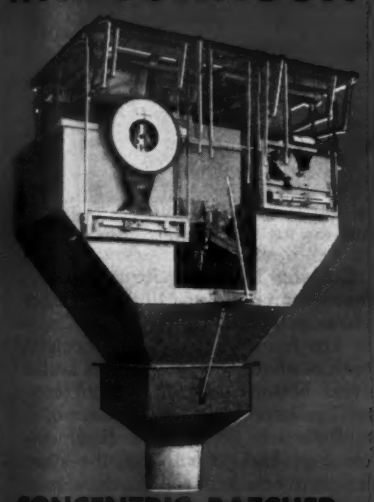
Submersible Sump Pump

A 4-page folder featuring the Kenco automatic submersible sump pump may be obtained from Kenco, Inc., 159 Ridge St., Elyria, Ohio. This compact unit, the literature points out, has a specially designed liquid-level control switch that eliminates the need for a float or float mechanism. Powered by a ⅓-hp motor, the unit is designed to deliver 3,300, 2,400, 1,200, and 400 gph at discharge heads of 10, 15, 20, and 22 feet respectively.

The folder is fully illustrated and includes a cutaway drawing of the liquid-level control switch. A complete description of the unit, its specifications, and its features, is also given.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 51.

with JOHNSON



CONCENTRIC BATCHER
Prevents Cement Loss

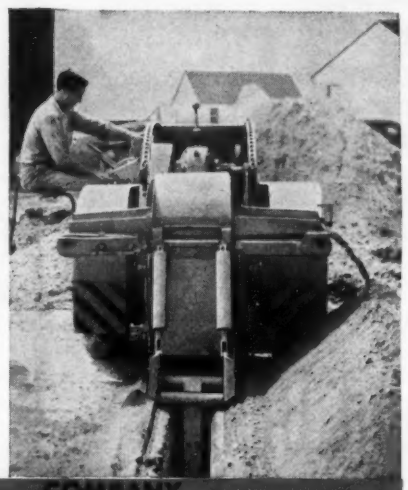
Exclusive Johnson Concentric Aggregate-Cement Batcher gives you control cement feed. Wasteful cement "gumming" is prevented by concentric arrangement of aggregates around the cement batcher discharge. Cement is also weighed on separate scale. Aggregates are weighed on individual beam scales, or accumulative dial scale. Result: you get extremely accurate control and the most efficient use of materials . . . at top batching speeds.

WATER BATCHERS
Improve Concrete Quality

Here's another handy auxiliary unit that can help increase your mix plant efficiency — Johnson Water Weigh-Batchers. Capacities: 120 gallons or 1,000 lbs. for batches up to 2 yards . . . and 240 gallons or 2,000 lbs. for batches up to 5 yards. Semi- and full-automatic types. They're fast-weighing . . . accuracy is not affected by changes in water temperatures.

HIGH-SPEED, RUBBER-TIRED
TRENCHMOBILE

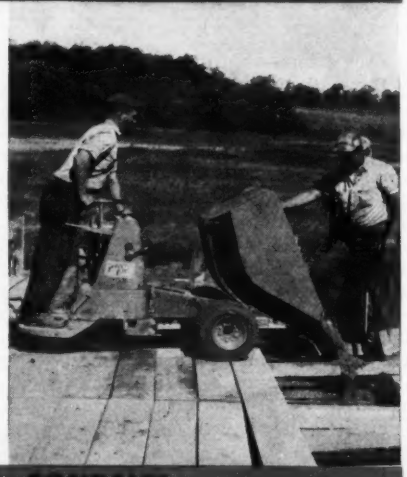
Gives you 18.9 m.p.h. job-to-job speeds . . . digs 14.65 ft. per min., up to 4 ft. deep, 5" and 8" wide . . . provides fast new method of handling off-street connections and other small trenching jobs. Ask your local Parsons distributor about this mobile, utility-size Model 80 Trenchmobile . . . or write us direct about the savings it offers on your work.



PARSONS COMPANY
Newton, Iowa
(Koehring Subsidiary)

LOW-COST, FULLY-POWERED
MOTO-BUG

On your wheelbarrow work, there's no pushing . . . no pulling with Kwik-Mix *fully-powered* Moto-Bug. Travels 1½ to 4 m.p.h., forward *and* reverse. Has positive, direct steer; *standard make* 4 h. p. air-cooled gasoline engine; 10 cu. ft. bucket; controlled gravity dump. 1200 lb. capacity flat-bed platform, and operator riding step also available.

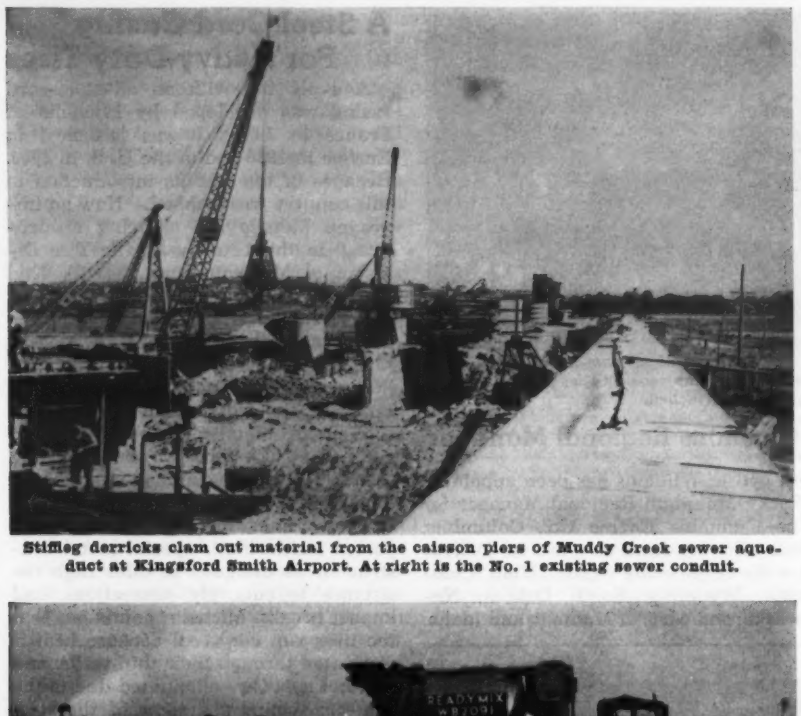


KWIK-MIX COMPANY
Port Washington, Wis.
(Koehring Subsidiary)

HEAVY-DUTY HALF-YARD
KOEHRING 205

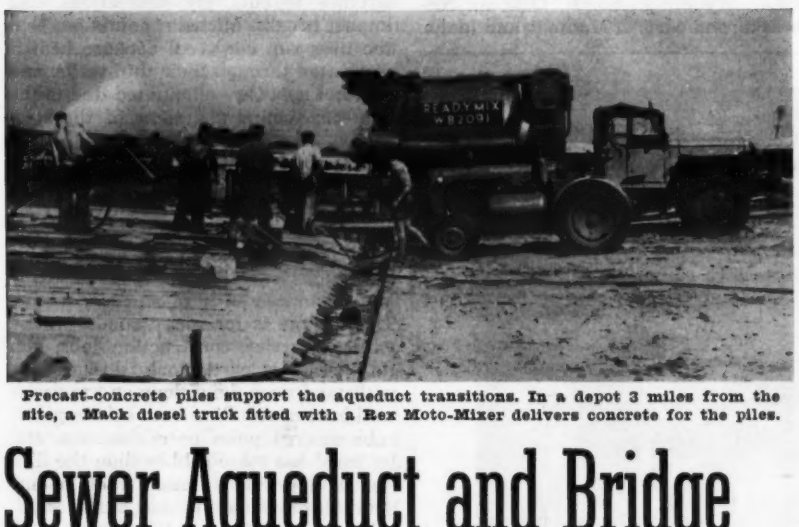
For top performance in the ½-yd. excavator class, check Koehring 205's independent traction, self-adjusting main clutches, simple, heavy-duty construction . . . quick convertibility from ½-yd. shovel or pull shovel to 7¾-ton crane, clamshell, dragline, on crawlers or rubber-tires. See your Koehring distributor, or send for big 28-page catalog.

KOEHRING COMPANY
Milwaukee 10, Wis.

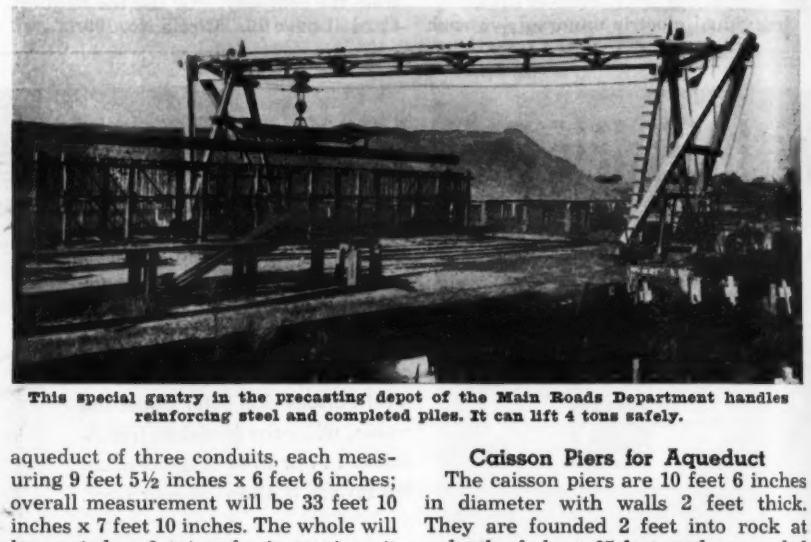


Stiffleg derricks clam out material from the caisson piers of Muddy Creek sewer aqueduct at Kingsford Smith Airport. At right is the No. 1 existing sewer conduit.

Here are two of the caisson piers ready for sinking. That's the mixing plant farther on, alongside the No. 2 sewer conduit. The tracks carry concrete from plant to pour.



Precast-concrete piles support the aqueduct transitions. In a depot 3 miles from the site, a Mack diesel truck fitted with a Rex Moto-Mixer delivers concrete for the piles.



This special gantry in the precasting depot of the Main Roads Department handles reinforcing steel and completed piles. It can lift 4 tons safely.

Sewer Aqueduct and Bridge Allow Airport to Reach Out

Concrete Structures Needed In Extension of Australian Airport; 8 Pairs of Caisson Piers Sunk to Rock

By H. BOWDEN FLETCHER, D.F.C., Australian Correspondent for Universal Trade Press Syndicate

✦ THE extension of Kingsford Smith Airport (see C. & E. M., April, 1949, pg. 98) at Mascot, Sydney, Australia, involves the building of two concrete structures of major importance: a sewer aqueduct and a traffic bridge.

The sewer aqueduct over Muddy Creek poses a somewhat difficult problem for the Metropolitan Water, Sewerage & Drainage Board. Existing twin aqueducts over the creek, approximately 200 feet long, carry one single-cell sewer conduit and one twin-cell conduit. Together, these conduits handle the whole of the sewage from the southern and western suburbs of Sydney. But Muddy Creek will have to be widened for incorporation in the new course of Cooks River. Therefore, a new and longer aqueduct has to be constructed—with no interruption during the job to the flow of sewage in the existing carriers.

The new structure will carry a single aqueduct of three conduits, each measuring 9 feet 5½ inches x 6 feet 6 inches; overall measurement will be 33 feet 10 inches x 7 feet 10 inches. The whole will be carried on 8 pairs of caisson piers; it will have seven 80-foot spans and a clearance at high tide of 9 feet 3 inches. The triple conduit will be constructed in three cantilever sections each 160 feet, and one supported section of 80 feet.

The new carrier and triple cell is being built alongside and parallel to the existing sewer. When completed, it will be connected to the existing system by transition sections at the end of the carrier on each side of the widened creek. During the whole construction period, it is essential that the flow of sewage be maintained. All the flow is now being passed through the single-cell conduit, which for future reference will be known as No. 1. The twin-cell existing conduit will be referred to as No. 2.

The actual work involved, therefore, consists of sinking 8 pairs of caisson piers, erecting the triple-cell sewer conduit, diverting the existing conduits into the new one, demolishing portions of the existing line not required, and constructing the transition sections. All this must, of course, be coordinated with the work of developing the airport itself, excavating the new river course, and filling the old Cooks River.

Caisson Piers for Aqueduct

The caisson piers are 10 feet 6 inches in diameter with walls 2 feet thick. They are founded 2 feet into rock at a depth of about 65 feet, and are sealed top and bottom with 10 feet of concrete. The lateral spacing between each pair of piers is 22 feet. M. R. Hornibrook Pty. Ltd. is sinking the piers under contract, and the work is proceeding more or less on schedule.

Excavation for sinking the piers is done from inside the steel form work by clamshell buckets handled by a pair of 2-ton stiffleg derricks with 50-foot booms. The spoil is loaded directly to dump trucks for transport to the airport, where it is used for filling the old bed of the river. The amount of excavation involved in this work is approximately 745 cubic yards of sand, 333 cubic yards of clay, 744 cubic yards of boiling sand, and 128 cubic yards of rock. When rock is being excavated at the base of a pier, a steel air lock is used to permit the men to work under water. The air lock was locally built and is owned by the contractor.

Concrete for the piers is transported from the 15-cubic-foot Britstand mixer in 1-cubic-yard Blaw-Knox buckets mounted on 2-foot-gage rail trucks which run along the top of the No. 2 sewer conduit. Diesel locomotives move the buckets to and from the mixer. On

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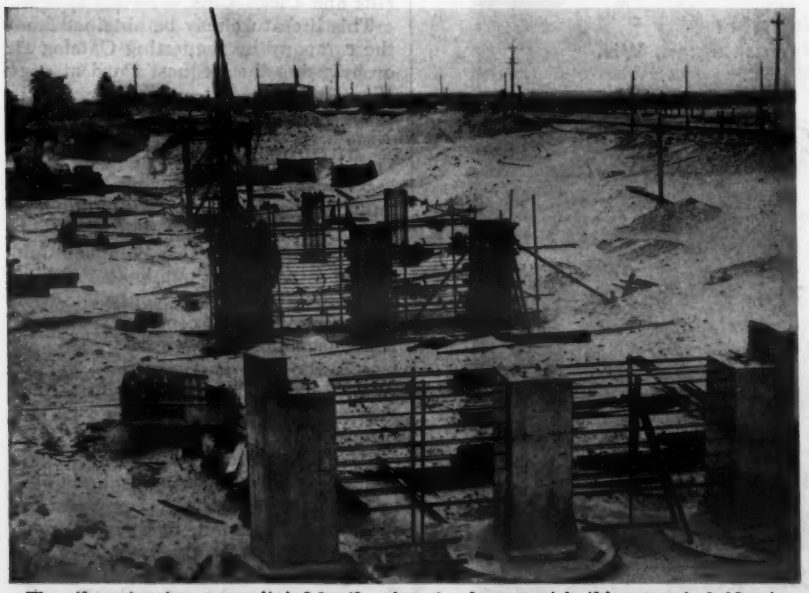
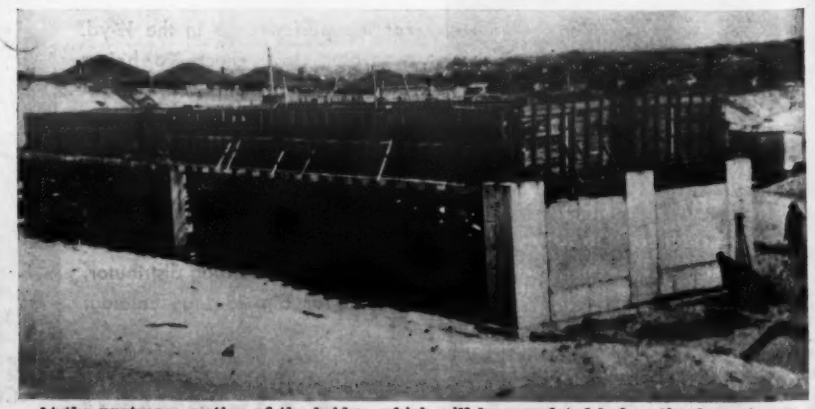


The other structure necessitated by the airport enlargement is this concrete bridge to carry General Homes Drive over Cooks River. Precast-concrete piles support the piers.



At the upstream section of the bridge, which will be completed before the downstream driveway is begun, forms are in place for pouring the main girders.

arrival at the job the buckets are lifted by a 10-ton Bay City truck-mounted crane.

The materials used in a cubic-yard batch of the pier concrete are:

Cement	282 lbs.
1½-inch round gravel	525 lbs.
¾-inch round gravel	360 lbs.
3/16-inch crushed metal	120 lbs.
Sand	300 lbs.

The aggregate is delivered by contractors to stockpiles adjoining the mixer, which is located on a platform against the side of the existing No. 2 conduit on the western side of Muddy Creek. There are three aggregate bins with bottoms 5 feet below ground level to hold the grades of gravel and sand in sufficient quantities to make 300 cubic yards of concrete. The service bins are filled from the storage bins by an electrically operated 2-ton stiffleg derrick with a 60-foot boom and a ¾-cubic-yard bucket. This crane was also used to lift the cement to the mixing bins, but provision has been made for an auxiliary electric hoist for this purpose.

To help sink the piers, unused steel forms for the cylinder concrete, or short sections of steel rails, are placed on a platform on the top of the cylinders. The forms are filled with earth, as the extra weight was found necessary to force the progressive sinking in harmony with the excavation.

Demolition

The southern barrel of No. 2 conduit is being progressively demolished by a 2-ton drop monkey handled by a Bay City mobile crane fitted with a 45-foot boom. In addition, the eastern end of the No. 2 conduit has been demolished to permit the construction of the transition between it and the new triple conduit at the first pair of piers. In the meantime, of course, the full sewage flow is maintained through the No. 1 single conduit.

Transitions Founded on Piles

The transition at the eastern end of the new carrier over the new river course is 163½ feet long; the western transition will be 136 feet 4 inches long. Both are founded on precast-concrete piles, 14 x 14 inches, steel-tipped and driven to a depth of 40 feet on the eastern and 45 feet on the western end. These piles are moved from the prefabricating depot to the job site on jinkers drawn by Ford trucks, and are lifted into position for driving by the Bay City mobile crane. They are water-jetted through sand and forced through the clay by a double-acting steam-operated pile hammer. To provide a clean surface on which to construct the transitions, a 1:3:6-concrete mattress 2 inches thick has been poured.

Here's a front view of the triple-cell sewer conduit under construction at Kingsford Smith Airport. At right is a demolished section of the No. 2 twin-cell conduit.

The piles are precast by the Department of Main Roads at its depot some 3 miles away. Steel reinforcement for them ranges from ¼ to 1 inch in size and is prepared in the depot by electric welding before being placed in the pouring forms located at ground level.

Ready-mixed concrete is delivered by Ready Mix Concrete, Inc., from its mixing plant 5 miles away, in Mack diesel trucks fitted with 4-cubic-yard Rex Moto-Mixers. It is poured directly from the trucks to a specially designed rectangular 2-cubic-yard steel-lined wooden container mounted on rails. This container has 4 chutes so that two pile forms can be filled simultaneously. As the forms fill, agitation is handled by an internal vibrator driven by compressed air from a Le Roi Model 105 Tractair.

For handling the completed piles, a specially designed gantry has been erected in the depot by the engineers of the Main Roads Department. It is worthy of more than passing comment.

Special Gantry for Piles

This gantry has a cross girder in the form of a rolled-steel joist, 18 x 6 inches, made from two 30-foot lengths welded end to end. The framework is of 8 x 6-inch Oregon and the girder is braced laterally by 6 x 4-inch Oregon. Height of the cross girder from the traveling rails is 16 feet 6 inches, and the distance between running rails is 46 feet.

Power for the traction is provided by

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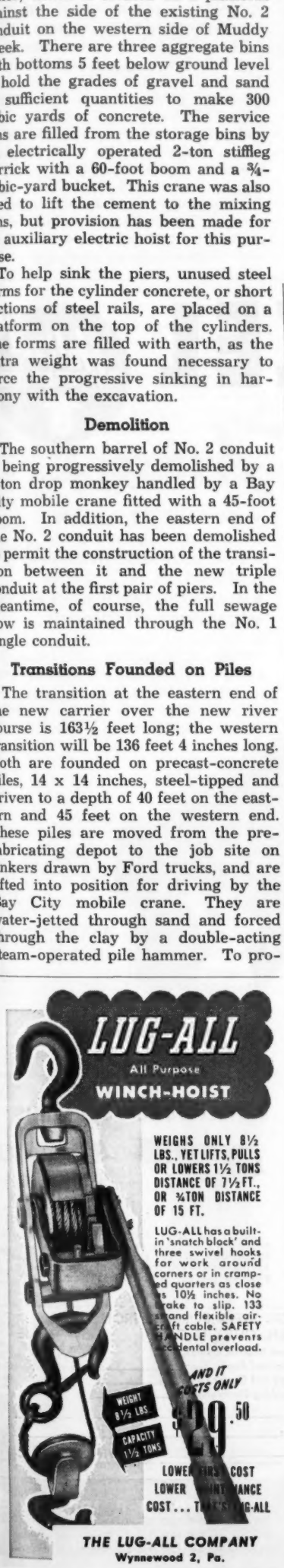
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Aqueduct and Bridge Allow Airport to Grow

(*Continued from preceding page*)

a 3-hp air winch which drives an overhead shaft running the length of the gantry. At each end of the gantry, power is transmitted from the overhead shaft to the driving wheels through a system consisting of an endless chain, a crab winch, and a gipsy wheel. Speed is 1 mph.

The lifting gear consists of a carriage running on the cross girder traversed by a 1¼-inch circular steel rope operated by a crab winch. The 2-inch circular steel lifting rope passes through a 3-sheaved pulley block on the carriage to a 3-sheaved bottom lifting block. The bottom block is attached to the lifting beam which consists of a 17½-foot x 15-inch x 6-inch rolled-steel joist with 6-foot x 5-inch x 6-inch hardwood extension arms at each end. The lifting dogs are spaced 23 feet apart on this beam. Power for lifting is provided by an Ingersoll-Rand EU air winch; the maximum safe load of the gantry is 4 tons.

Incidental Work and Conduits

When the 8 pairs of caisson piers have been completed, the two cantilever sections of the aqueduct, each 160 feet long, and the triple-cell conduit will be constructed. The No. 1 sewer, which is now handling all the existing flow of sewage, will then be joined into the center barrel of the triple conduit by temporary fluming. This fluming will be built of timber, double-lagged and painted with bitumen and supported on the headstocks of the existing No. 2 conduit, partly on piles and the headstock of the eastern pair of caissons.

At this period of the construction, the southern barrel of the No. 2 conduit will also be demolished by the drop monkey previously mentioned, to give elbow room for the stiffleg cranes to handle materials arriving along the northern barrel of the same conduit.

The first pours of the triple-cell conduit are screeded off 1½ inches below finished invert level, and the floor surfaces and wall recesses are scabbed. The surface is then coated with a cement grout and the invert veneer poured. The lower walls are being poured to a height of 4 feet 2½ inches and the roof and remaining walls placed integrally. To prevent vibration of the steel reinforcement during the early setting stages, a movable working platform is used. Agitation of the concrete is handled by an internal vibrator operated by an Ingersoll-Rand compressor.

The materials being used in a cubic yard of concrete for the aqueduct are:

Cement	282 lbs.
¾-inch round gravel	790 lbs.
3/16-inch crushed metal	150 lbs.
Sand	300 lbs.

The final stage of the work will be the connection of the remaining two cells of the triple-cell conduit to the existing No. 2 twin-cell conduit at each end of the new crossing of the river, and the final demolition of the unused sections of both the existing conduits and the removal of temporary fluming. In all, 6,562 cubic yards of concrete will be required, involving 5,500 cubic yards of gravel, 1,400 cubic yards of crushed metal, and 2,500 cubic yards of sand.

Traffic Bridge

The second of the two jobs mentioned at the start of this article is the traffic bridge to carry General Homes Drive over the new course of Cooks River. This is a 568-foot reinforced-concrete structure with 8 spans, each 62 feet 8 inches. It is about 100 yards in from the shores of Botany Bay into which Cooks River will empty. It will have two 24-foot carriageways, separated by a 12-foot gap, with a 7-foot footway on each side. The whole structure will be supported by seven 3-column piers for each driveway, with the piers connected by a 9-inch curtain wall.

The work is being carried out in two stages. The upstream driveway is now under construction, and it will be completed and open for traffic before the downstream driveway is commenced.

As preliminary borings failed to locate any rock for foundations down as far as 90 feet, it was decided to mount the piers on concrete piles. These have been precast at a depot of the Main Roads Department, some 2 miles from the site, by the method described earlier in this article. They are the same size as those used in the sewer aqueduct transitions: 14 inches x 14 inches x 40 feet.

When work commenced, the new course of the river had been excavated to a depth of 15 feet. Concrete cylinders 9 feet 6 inches in diameter and 7 feet deep were poured at the lower ground level, using ready-mixed concrete delivered in Mack diesel trucks equipped with 4-cubic-yard Moto-Mixers. The cylinders were then sunk to their full depth from within, using a ⅜-cubic-yard clamshell mounted on a Bucyrus-Erie mobile crane with a 30-foot boom. The material excavated was loaded directly to dump trucks for transport to the airport, where it will be used for fill.

To keep sand from filtering into the cylinders, a false steel top was added to the top of the concrete. When the cylinders had reached the required depth, 7 of the steel-shod concrete piles were driven by a 6-ton steam drop hammer to a depth of 40 feet. One pile was driven in the center and the other 6 in a circle round it at a distance of 3 feet 3 inches center to center.

During the pouring of the cylinders, a temporary wooden platform was erected on top of the form work to facilitate the agitation of the concrete by an internal vibrator operated by an electric motor at 3,000 rpm.

When the piles were driven, the whole was sealed with concrete to the top of the cylinder level, once again using ready-mixed concrete delivered as previously mentioned. The false steel cylinder top was then removed and the construction of the piers themselves commenced.

These pier columns are 4 feet square, and from the top of the cylinders, just above water level, to the underside of the girders is 14 feet. Each of the piers is joined with a 9-inch curtain wall.

The outer girders in each span are 62 feet 9 inches long x 6 feet 7⅞ inches deep and 1 foot 9 inches thick, while the inner girders are 62 feet 8 inches long, 7 feet deep, and 2 feet thick. The main girders were prefabricated at the depot where the piles were prepared. Concrete was delivered from the ready-mix trucks at road level into bottom-dumping buckets of 1-cubic-yard capacity. The buckets were hoisted into position for pouring by a 4/5-ton flying

(*Concluded on next page*)

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fox, which was erected down the center line of the work to move heavy materials used for the whole of the bridge construction. At the same time other trucks delivered the mixed concrete to ⅜-cubic-yard side-dump buckets at the lower ground level. These buckets were lifted to pouring position by the Bucyrus-Erie Model 15-B mobile crane with a 30-foot boom.

Vibration of the concrete was handled by two types of internal vibrators, one driven by compressed air supplied by a Le Roi Tractair, and the other by an electric motor operating at 3,000 rpm.

Materials

In all, 4,650 cubic yards of concrete, chiefly of the 1:1½:3 mix, will be used, as well as 300 tons of reinforcing steel and some 15,000 feet of piling.

Reinforcement used for the various portions of the job is as follows:

Piles	¼, ¾, and 1-inch diameter
Piers	⅜ to 1½-inch diameter
Curtain walls	½ to 1½-inch diameter
Girders	½ to 1½-inch diameter

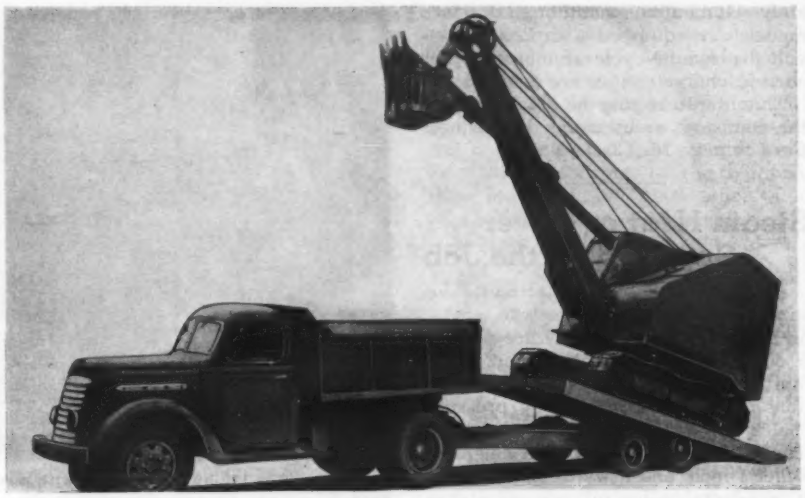
The main pile load at the abutments and piers is 25 tons. The structure has a Commonwealth standard loading of 18 tons. The channel bank at the bridge abutments will be pitched with hand-packed stone. The depth of the river, at mean tide level, when the new course is complete will be 12 feet 6 inches.

It was hoped that the full bridge would be operating by the middle of this year, provided no unforeseen troubles held up the delivery of the essential materials. Its construction is in the hands of the New South Wales Department of Main Roads.

Tandem-Axle Trailers With Tilt Platforms

Three new tandem-axle semi-trailers with tilting platforms, in 13, 16 and 20-ton capacities, have been announced by La Crosse Trailer Corp., La Crosse, Wis. Easily loaded and unloaded in a few minutes by one man, without the use of skids or blocks, the new trailers are designed to save time and labor in moving equipment from one location to another. All that is necessary, according to the manufacturer, is to unlock the safety catch to tilt the platform; drive the equipment onto the platform, which automatically returns to level position; lock the catch and secure the load. For unloading, the procedure is reversed.

Double-acting hydraulic cylinders cushion the 96-inch-wide trailer platform while it is being tilted with or without a load. A pair of chains prevents the cylinders from becoming over-extended during the tilting. All three trailers are equipped with walking beam axle supports to provide maximum oscillation of each wheel for equal load distribution. The trailers have 12¼ x 6-inch constant-rise S cam brakes, with ¾-inch bolted-on linings, and are fitted for either air or vacuum operation. The 13, 16, and 20-ton trailers weigh approximately 6,180 pounds, 8,000 pounds, and 8,400 pounds; they are equipped with eight 7.50 x 15, 9.00 x 15, and 10.00 x 15 tires, respectively. Gross load is distributed approximately 10 per cent on the drawbar and 90 per cent on the axles.



The new tandem-axle tilt trailer developed by LaCrosse makes it possible for one man to load and unload ½-yard shovels, and other 13 to 20-ton loads, for job-to-job transport, in only a few minutes. No skids or loading blocks are needed.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 66.

Evans to Represent Galion

Charles O. Evans is now a District Representative for the Galion Iron Works & Mfg. Co., Galion, Ohio. He handles the sale of Galion motor graders and rollers in the states of Washington, Oregon, Idaho, Montana, Utah, and Wyoming. Mr. Evans replaces James D. Borror, who has accepted a sales position with Loggers & Contractors Machinery Co., distributor for Galion in Oregon and southern Washington.

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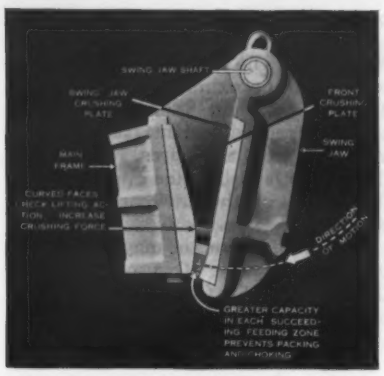
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GREATER CAPACITY IN EACH SUCCEEDING FEEDING ZONE PREVENTS PACKING AND CHOKING

The new curved surfaces on Traylor jaw crushers are designed to cut out all packing and choking.

Curved Jaw Plates Improve Crushing

A new curved-surface jaw-crusher plate made by Traylor Engineering & Mfg. Co. of Allentown, Pa., is designed to eliminate packing and choking, cut power costs, reduce waste fines, and turn out a more uniform cubical aggregate.

The curves over the faces of the plates are so contrived as to give each succeeding zone in the crushing chamber greater capacity than the preceding zone, allowing free fall of the material as it progresses through the crushing chamber. By applying power as a direct crushing force, counter to the crushing surface, less power is wasted lifting and churning material. This also reduces the percentage of waste fines and accounts for longer plate life, Traylor states. Curved jaw plates are available as original equipment on all Traylor jaw crushers or may be installed as replacement plates.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 21.

Offer Push-Button Control For Line of Electric Hoists

The push-button automatic control feature of King electric hoists is highlighted in new literature recently prepared by King Mfg. Co., 3146 W. Chicago Ave., Chicago 22, Ill. Materials elevators on construction projects can be brought to exact elevations from one or more push-button stations by even an unskilled operator, the company says.

The new circular on the King 800 Series points out that these units are available in five different models with from 2 to 10 hp and capacities from 600 to 3,000 pounds. It explains that where blocks are used to increase the load capacity, the standard 100-fpm line speed will be decreased proportionately. It mentions that though standard models are equipped with 220 to 440-volt 3-phase 60-cycle ac motors, other current characteristics are available.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 10.

Steam Heat or Power Supplied on the Job

A 150-hp portable type of boiler for supplying heat or steam power service on the job is made by the Lucey Boiler & Mfg. Co., Chattanooga, Tenn. It is built to standard ASME code specifications and provides a working pressure of 150 psi. The boiler has an overall length of 23 feet 10 inches, a height of 8 feet 1 inch, and a width of 74 inches. It is adaptable for oil, gas, or stoker firing and has a minimum of brickwork or refractory lining, the company says.

Each boiler is furnished with a steam gage, siphon, cock and inspector's test connections, ASME safety valves set to suit individual operating pressures, water-gage glass, blow-off valve, a globe and check valve for feed, and the necessary handhole and manhole plates complete with gaskets. A 34-inch-diameter smokestack, 36 feet long, is also furnished.

The 150-hp Lucey boiler with a renewable insulating boiler casing.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 6.

VEINS FOR HIGH-PRESSURE HYDRAULIC SYSTEMS

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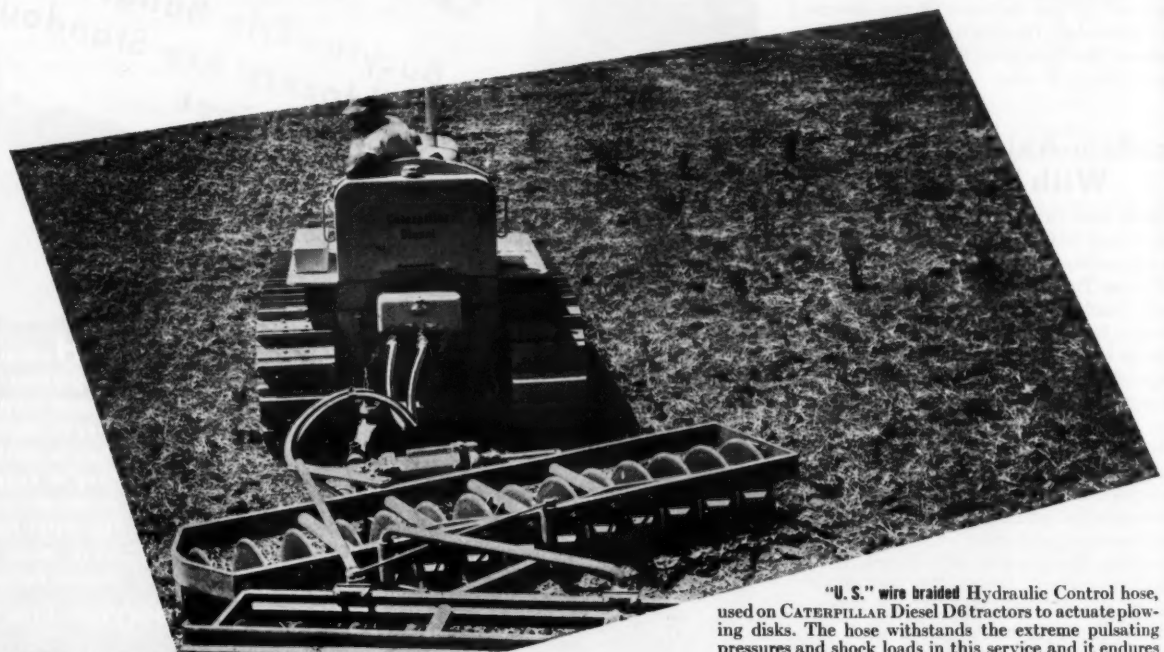

"U. S." wire braided Hydraulic Control hose, used on CATERPILLAR Diesel D6 tractors to actuate plowing disks. The hose withstands the extreme pulsating pressures and shock loads in this service and it endures repeated flexing.

Building dams for farm ponds in soil erosion is among the many hydraulic applications of the "U. S." Hydraulic Control hose. On such equipment as hydraulic lifts, bulldozers, snow plows . . . this hose proves its resistance to abrasion and the action of oils, greases, and solvents.

Scraper building a timber access road uses "U. S." braided Hydraulic Control hose. The weather-resistant, oil-resistant neoprene cover is bonded tightly to carcass. High hydrostatic strength is built into the hose through the use of high tensile braided steel wires.

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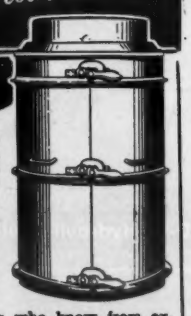

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.

Quinn Heavy Duty Pipe Forms

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.
Also manufacturers
QUINN CONCRETE PIPE MACHINES

QUINN WIRE & IRON WORKS [illegible] BOONE, IA.

Sub-Base Rushed On Road-Mix Job

Two Shifts on Crusher Produce 87,340 Tons of Material to Allow Road-Mixing Before the September Deadline

♦ A 16.2-MILE highway project, from grading to pavement, was built completely in a single short construction season. The project is about 40 miles south of Wendover, Nev., between there and Ely. Isbell Construction Co. of Reno hurried the $365,000 undertaking for the Nevada Department of Highways. Moving right in after the contract was awarded on April 16, this fast-moving contractor beat the September 15 time deadline with room to spare.

Helped by 20 days of rain in a country where moisture seldom falls that way, Isbell Construction Co. highballed its grading equipment, double-shifted the crusher, and put plenty of rock trucks on the haul in an effort to get all the aggregate on the roadbed in plenty of time to permit road-mixing early in September. The preparation of roadbed was one of the major keys to the completion of the project. At the rate Isbell's road-mixing crew operated, the 16-mile section took not more than that many days.

It is a nice road job. Both ends of the project are in mountains, while 8 miles lie across a flat desert floor of buck dust and sagebrush. Much of the project is tangent alignment. The few crooked places in the old road were made straighter in the new.

Major quantities included 175,795 cubic yards of unclassified excavation; 48,345 cubic yards of rock excavation; 25,954 tons of pit-run base-course material; and 87,340 tons of gravel surface material 1-inch maximum size for the upper sub-base course, which includes 2½ inches of bituminous road-mix.

Improves Important Route

Isbell's work has improved U. S. 50, one of Nevada's main eastern routes, as it passes between Ely, in the central eastern part of the state, and Wendover, on the edge of the Great Salt Lake Desert. The old pavement was 18 feet wide, but the new road-mixed surface is 26 feet, the full width of roadbed.

Right-of-way acquisition would have been a delight to many an engineer currently wrestling with that complex problem, especially in some of America's major cities. Here they made a few negotiations with the Bureau of Public Roads and the U. S. Forest Service. The highway passes through miles and miles of public land, so all they had to do was to set the new stakes over a short distance, wherever they wanted them. There was no property owner to object. A few white-faced cattle looked curiously at the location surveyors. A few rattlesnakes buzzed in protest as they got out of the way, and several herds of antelope faded silently from a spring near the center of the work. That was all. The vastness of this quiet land is such that it can swallow anything—including a 16-mile highway project.

The new reconstruction consists of a compacted-earth or rock subgrade, raised up somewhat off the surrounding terrain as a protection against winter snow and flash floods. Over the top of this subgrade is 6 inches of crushed gravel, with a maximum size of 1 inch. The upper 2½ inches of this course, blended with SC-3 asphalt, forms the road-mix pavement.

From 2 to 8 inches of 3-inch-minus pit-run gravel, called Type 1, was also used between the gravel surface material and the earth subgrade. The amount of this material depended entirely on the nature of the soil and its ability to carry loads. Where the highway passes practically through the main gravel pit, for example, no Type 1 material was needed on the road.

Grading Gets Under Way

Moving in right after the contract was awarded, Isbell Construction Co. shot equipment from the Reno yard eastward, over 400 miles to the new project. Arnold Blair was assigned as Superintendent. He set up a camp near the center of the work, and got his grading equipment in high gear.

Through all the flat country and some of the hilly terrain, Blair used four LeTourneau Model W Carryalls with D8 Caterpillar prime movers. A LeTourneau FD machine with a D8 pioneered the trail by removing sagebrush, while a J-13 Carryall with a D8 did finish work behind the four main machines.

They borrowed excavation from a channel parallel to and about 75 feet west of the highway, to build the subgrade through the flat desert floor. It was short-haul work, with easy digging. Specifications were set up for approximately 13,000,000 gallons of water, with only three sources anywhere around. Anticipating a great deal of trouble getting this water out to the highway, Blair brought in two 2,000-gallon tanks on F8 Ford trucks, a 5,500-gallon tank on a Mack, and another Mack-mounted 3,500-gallon tank.

The water tanks had hardly started to work when a miracle happened. Eastern Nevada skies, normally blue that time of the year, clouded up. It began to rain: not the slashing cloudburst kind of storm, but a gentle, pattering drizzle. For 20 days out of the first month it kept this up, putting about 75 per cent of the needed mois-

(*Continued on next page*)

"BERG" Concrete Surfacer

A light-weight, portable, electric motor-driven Concrete Surfacer consisting of the Model R-2 Right Angle Head and Model AS Motor Unit.

Ideal for surfacing concrete construction and other applications.

Quickly converted into the Model V2-AS Concrete Vibrator for Internal vibration by substituting the Model V2 Vibrator Unit for the above Head.

The Concrete Surfacing Machinery Co.
4665-4669 Spring Grove Avenue, Cincinnati 32, Ohio

Never Before SUCH POWER . . .
Never Before SUCH VALUE . . .
in Chevrolet P•L Advance-Design Trucks

America has learned to expect the most from Chevrolet. And now the line that outsells all others brings truck users still more: More power—to make light of maximum loads. More value—to make sure of minimum costs.

Everywhere—on every kind of job, every kind of road—these new P•L models are proving themselves the greatest of a great line. Yet Chevrolet trucks are notably low in price and in operating and maintenance costs. No wonder that year after year Chevrolet trucks are the Nation's Favorite!

CHEVROLET MOTOR DIVISION, *General Motors Corporation*
DETROIT 2, MICHIGAN

LEADING WITH ALL THESE PLUS FEATURES:

• TWO GREAT VALVE-IN-HEAD ENGINES: the New 105-h.p. Load-Master and the Improved 92-h.p. Thrift-Master—to give you greater power per gallon, lower cost per load • THE NEW POWER-JET CARBURETOR: smoother, quicker acceleration response • DIAPHRAGM SPRING CLUTCH for easy action engagement • SYNCHRO-MESH TRANSMISSIONS for fast, smooth shifting • HYPOID REAR AXLES—5 times more durable than spiral bevel type • DOUBLE-ARTICULATED BRAKES—for complete driver control • WIDE-BASE WHEELS for increased tire mileage • ADVANCE-DESIGN STYLING with the "Cab that Breathes" • BALL-TYPE STEERING for easier handling • UNIT-DESIGN BODIES—precision built.

CHEVROLET
P*L*
ADVANCE-DESIGN TRUCKS

P*opularity L*eaders
Chevrolet trucks outsell all others. In every postwar year truck users have bought more Chevrolets than any other make—*proof* of the owner satisfaction they have earned throughout the years.

P*erformance L*eaders
The new Chevrolet P•L trucks give you high pulling power over a wide range of usable road speeds—and on the straightaway, high acceleration to cut down total trip time.

P*ayload L*eaders The rugged construction and all-around economy of Chevrolet P•L trucks cut operating and repair costs—let you deliver the goods with real reductions in cost per ton per mile.

P*rice L*eaders The Chevrolet truck line is the very lowest priced line in the field—saves on initial cost. What's more P•L trucks give owners dollar and cents savings in maintenance and operation.

CHEVROLET

C. & E. M. Photos

Rock on the Nevada job wasn't nearly as hard as Isbell Construction Co. expected. At left, a Cleveland wagon drill, with air furnished by a big Joy compressor, starts a hole. Center, a Northwest Model 6 shovel loads blasted rock from a hilltop cut to a Mack truck. Right, the Mack end-dumps the rock over the edge of a fill as a D8-mounted dozer stands by.

Sub-Base Is Rushed On a Road-Mix Job

(*Continued from preceding page*)

ture in the dirt, free of charge.

The equipment operators made the most of their opportunity. Each day the pioneer Carryall worked extra hours, if necessary, to get a piece about 3,000 feet long ready for the other machines. The next day the main fleet of tractor equipment arrived and placed embankment over that portion. At one time a D8 with two 16-foot sheepsfoot rollers and an International rubber-tired tractor with a smaller sheepsfoot were all working simultaneously to compact the dirt to the 90 per cent modified AASHO density required by specifications. When the main fleet of tractor equipment had passed, the J-13 finish Carryall leveled the grade and finished filling in the rough spots. A final dressing by a Caterpillar No. 12 motor grader, working to surveyor's blue-tops, readied the subgrade for Type 1 or Type 2 gravel.

Extensive rock excavation was indicated on the plans. A preliminary inspection, made when the job was bid, gave every reason to expect some stubborn material. Outcrops were weathered and very hard. But when rock excavation really got under way, Dame Fortune smiled again. What had looked hard turned out to be shale and blue lime rock, not as tough to remove as had been expected.

Three Cleveland wagon drills, with a truck-mounted Joy 500-cfm air compressor, were brought in. With depths of rock removal varying from 3 to 30 feet, no set pattern of drilling was possible. Timken steel in maximum lengths of 20 feet was used, with Timken rock bits. A bit would drill about 150 feet before dulling.

Hole spacing was carefully calculated in direct ratio to depth. A 3-foot-deep hole, in that shallow a cut, was usually spaced on 3-foot centers. The maximum 20-foot-length holes, on the other hand, were spaced about 12 feet apart. Everything in between was approximately on that ratio, with perhaps a few adjustments here and there to take care of an especially hard pocket.

It is a noteworthy commentary on the competence of the drilling crew and the excellence of their equipment that only two pieces of steel were stuck and lost in the entire rock-removal activity.

The powder holes were sprung with from 3 to 8 sticks of 60 per cent gelatin, depending on the depth of hole. Then the holes were loaded with granular-type powder, either Hercomite or Atlas Flo-Dyn. No. 6 electric blasting caps and a hand blasting machine exploded the shots. The blast broke the rock out close to slope lines, and about 2 feet below roadbed grade.

Broken stone was handled by a Northwest 6 shovel with a 1½-yard dipper. From 4 to 6 LM Mack diesel trucks, with 12-cubic-yard rock bodies, hauled the material to the rock fills. The stone was end-dumped and spread in 3-foot lifts by a Caterpillar D8-mounted bulldozer blade. For weeks the shovel averaged 1,000 cubic yards per 8-hour shift, and the trucks kept the material moving toward the fills.

The rocky cuts received a 6-inch gravel cushion under the road-mix material, which will retain the smoothness of the pavement for years to come.

Gravel Production Most Important

The production of crushed gravel to build the sub-base and make the surface was as critical an operation as grading, so far as the overall progress of the work was concerned. Continuous peak performance of the crushing-screening plant, sometimes at rates as high as 260 tons per hour, kept the hauling trucks rolling out to the new subgrade.

Four gravel-pit sites were set up by the specifications. Two were used, and it was expected that some pit-run material might be hauled from a third. A great deal of the material for the southerly half of the project was hauled from a pit 2 miles in from the south end. The majority of the remaining material was produced in the pit 5 miles

(*Continued on next page*)

RE-LINE WORN TRUCK BOTTOMS

with

MANGANAL

(T.M. Reg. U.S. Pat. Off.)

11%-13½% MANGANESE-NICKEL STEEL

Hot Rolled Plates

- TRUCK BOTTOMS last longer when lined with tough, wear-resisting MANGANAL.
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- HOT ROLLED PLATES are available in sizes 3/16" to 1" thickness, 48" x 144".
- APPLY HOT ROLLED PLATES with MANGANAL Special Tite-Kote Electrodes.

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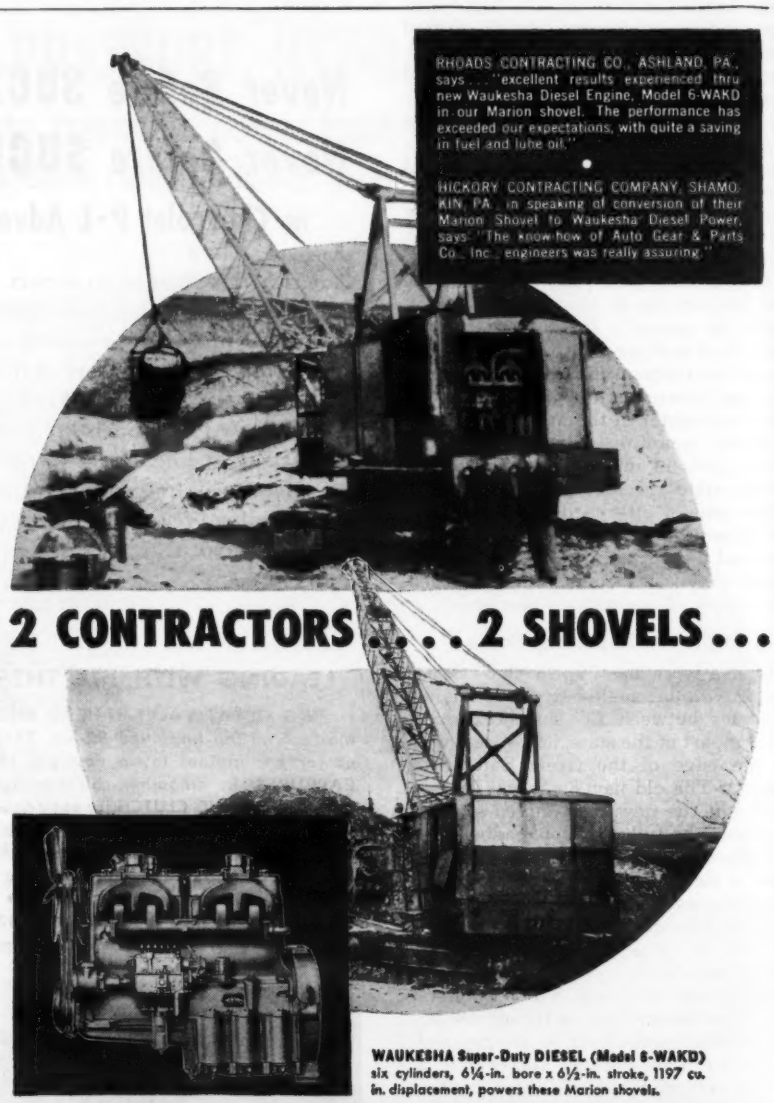

RHOADS CONTRACTING CO., ASHLAND, PA., says . . . "excellent results experienced thru new Waukesha Diesel Engine, Model 6-WAKD in our Marion shovel. The performance has exceeded our expectations, with quite a saving in fuel and lube oil."
HICKORY CONTRACTING COMPANY, SHAMOKIN, PA., in speaking of conversion of their Marion Shovel to Waukesha Diesel Power, says "The know-how of Auto Gear & Parts Co., Inc., engineers was really assuring."

2 CONTRACTORS . . . . 2 SHOVELS . . .

WAUKESHA Super-Duty DIESEL (Model 6-WAKD) six cylinders, 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displacement, powers these Marion shovels.

WAUKESHA Diesel POWER

does a better job for BOTH!

For shovel work particularly, the most outstanding of all Waukesha Diesel characteristics is smoothness and trigger-quick response to the operator's every command. Lively, yet shudder-free, it meets every power and load demand with all the smoothness of steam. And that's a new experience, even to an old Diesel hand. Clean burning, its fuel economy is excellent. Built with rugged simplicity. Such features as hard, wet cylinder sleeves, simple overhead valve mechanism, gear-driven water pump cooling, and pressure oiling—all make the Waukesha Diesel easy to understand and simple to service. For all the details, send for Bulletin 1415.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN

NEW YORK TULSA LOS ANGELES

C. & E. M. Photos

Isbell's gravel plant starred on the 16.2-mile Nevada highway project. In the first picture, the crusher layout with the feeder hopper at the far left, beyond the conveyor belt. A Caterpillar bulldozer on a D8, center, pushes material to the crusher hopper. And at right, a Mack truck dumps road-mix aggregate on the center of U. S. 50.

from the northerly extremity of the work.

Specifications for the two types of granular material met State of Nevada Department of Highways standard specifications:

Size Screen	Per Cent Passing, Type 2	Per Cent Passing, Type 1
3-inch	....	100
1-inch	100	45-80
¼-inch	80-100	....
No. 4	45-70	....
No. 10	35-50	20-45
No. 40	15-35	....
No. 200	5-12	0-15

The two pits which furnished the gravel were ideally suited to the production of material that size. The Type 1 pit-run fitted in perfectly, and there were no oversize stones to be thrown out. In the production of the Type 2 graded material smaller than 1 inch, only about 25 per cent had to be crushed. The remainder was naturally graded millions of years ago, when the round gravel there was part of an ancient lakebed.

The gravel plant which Isbell used on the work was once a standard manufacturer's product, but many alterations over the years have changed it until it combines the good points of every manufacturer's product represented, with the result that the per cent of effective operating time is very high. With the exception of normal screen and cone-crusher liner wear, the plant works week after week at a steady output.

The raw pit-run material was picked up and hauled close to the plant feeder hopper by a D8 and an FP LeTourneau Carryall. From the point where this tractor equipment combination dumped the material, it was handled by a D8-mounted bulldozer blade, which pushed it into the trap. Grizzly rails separated any large particles which were not desired, and the balance dropped through to a Pioneer reciprocating feeder, which maintained a flow of rock to a Pioneer conveyor belt.

The conveyor belt hoisted the raw material to the plant proper, where it dumped out on a set of Symons double-deck vibrating screens, 4 x 10 feet in size. Half the top deck consisted of a 1¼-inch scalping screen and half was a 1-inch regular screen. The lower deck consisted of 1-inch mesh, with one 4-foot section of ¼-inch rejecting screen. There were few rejects in this pit, however.

Rocks retained on the scalping screen dropped off into a 6-foot Symons cone crusher, which broke them down. Fine rock then went back to the upper screen deck by means of a bucket-line conveyor. All material passing through the screens went to a belt conveyor, which took it to a 20-ton transfer bunker. Here the trucks were loaded.

The entire plant was driven by one Caterpillar D13000 diesel engine, and minor parts were interconnected by chain or belt drives.

Don McCowan, the operator on the first shift, told how the entire plant had been dismantled, moved 10 miles, and set up again all in 8 hours. "We were running again at the end of 8 hours," he said.

The crushed material was hauled to the roadway by a fleet of 9 dump trucks. Four were 6-yard Fords; 3 were 6-yard Internationals; 2 were 9-yard Macks. The material went over a scale before leaving the pit, and the driver delivered his weight ticket to the state dump man, who spaced the dumps accordingly.

The crushed material, after being dumped in the center of the highway, was thoroughly mixed by a No. 12 Caterpillar motor grader under the expert handling of Buford Roark. In the west, especially, blade men sometimes get so good that they can very nearly write their own ticket. Such a man is

(*Concluded on next page*)

"BICKNELL BETTER BUILT"
PAVING BREAKER TOOLS

We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers,
Write for descriptive circular
BICKNELL MANUFACTURING CO.
12 LIME STREET ROCKLAND, MAINE

The ad that failed

...and why!

Proving that Mack trucks outlast them all!

Mack

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

Thanks — but no! "Our fleet comprises 235 motor vehicles and includes 136 Macks, several of which have passed the fifteen-year mark . . . one is in its twenty-fifth year. All are registered and operating profitably. We can see no reason to retire such trucks at this time." C. W. HALL, PRESIDENT, C. E. HALL & SONS, SOMERVILLE, MASS.

Not trading! "My 1923 Mack still does its share to gross me $3,000 per year in the moving business—and I have spent less than $100 in repairs on this truck in the last 20 years. Obviously, I am not interested in trading." I. V. ASHBY, ASHBY HOUSE MOVING CO., OKLAHOMA CITY.

Will keep! "Our 1934 Mack is still giving good service—it is the oldest of our 30 Macks but still good enough to keep." CLARENCE J. SMITH, SMITH BROS. TRUCK CO., LOS ANGELES, CALIFORNIA.

Still too good! "With reference to your proposal to give us an extra allowance on our Bulldog Mack purchased in 1922—please be advised that this truck is too good to trade in." J. KOLKO, SPEEDWAY WRECKING CO., CHICAGO, ILL.

Trade? not yet! "Forty-two of our trucks are Macks—some of them 27 years old. They outlast any other make and have proved very economical to operate. Not trading yet." JOSEPH CAPECCI, PHILADELPHIA, PENNA.

Sub-Base Is Rushed On a Road-Mix Job

(*Continued from preceding page*)

Buford Roark. He is known throughout Nevada about as widely as W. T. "Billy" Holcomb, State Highway Engineer.

Water was added by sprinkler truck while the material was mixed. It was then laid down by moving thin layers out to the shoulder line, rolling with a 10-ton roller, and finally shaping the center. Final rolling on the gravel base was done by a 3-wheel 13-ton machine.

The road-mixing was done by a Gardner Mixer. SC-3 asphalt was trucked in and unloaded directly into the Gardner machine as it made its initial pass through the material. From 3 to 5 passes were needed to accomplish the thorough blending which Nevada requires. After that, it was bladed a few times by a motor grader, and Roark then laid it down so smooth that tourists remarked later, "I don't see how Nevada gets such good roads; nobody lives here."

The job called for an MC-2 seal coat, with no armor chips.

Personnel

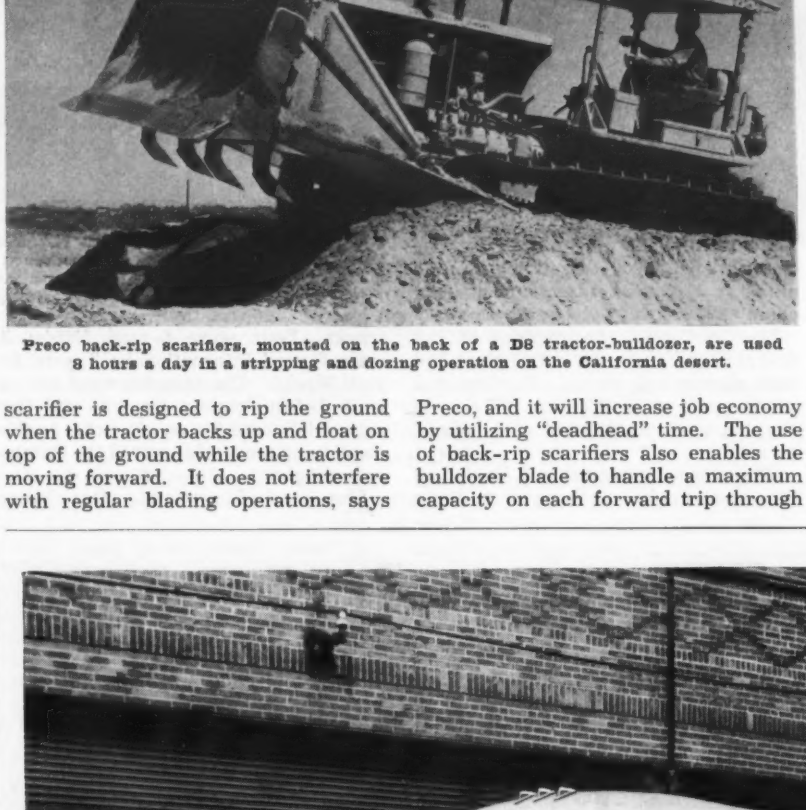
Known officially by its Federal-Aid number of F 002-5 (1), the project was designed and supervised under the general direction of W. T. Holcomb, State Highway Engineer, and J. D. Meacham, Construction Engineer. Eddie Marriage was the Resident Engineer.

Assisting Arnold Blair were Grade Foreman A. C. Blair, and Crusher Plant Foremen Don McCowan and William Ponton.

While crews under these men worked like ants to get the job finished, the silent mountains stood aloof and forbidding, mocking the puny efforts of men. But those efforts were conquering the mountains and the rangeland. Of prime importance to every man was the hope that one day soon they could get back to so-called civilization.

Back-Rip Scarifiers

A back-rip scarifier, designed to rip and loosen packed soil, black-top, and hard ground, has been introduced by Preco, Inc., 6300 E. Slauson Ave., Los Angeles 22, Calif. Mounted on the back of a bulldozer moldboard, the scarifier is designed to rip the ground when the tractor backs up and float on top of the ground while the tractor is moving forward. It does not interfere with regular blading operations, says Preco, and it will increase job economy by utilizing "deadhead" time. The use of back-rip scarifiers also enables the bulldozer blade to handle a maximum capacity on each forward trip through preworked soil.



Preco back-rip scarifiers, mounted on the back of a D8 tractor-bulldozer, are used 8 hours a day in a stripping and dozing operation on the California desert.

A set of back-rip scarifiers consists of four curved shanks capped with lock-on replaceable teeth, each mounted in a separate housing which is welded to the back of the bulldozer moldboard. The teeth are made of a tough steel alloy and can be raised and pinned out of the way when not in use.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 75.

Flooring and Decking

A 24-page catalog on open steel grating has been prepared by the William F. Klemp Co., 6601 S. Melvina Ave., Chicago 38, Ill. Various types of gratings, floorings, and bridge decking, in both steel and aluminum, are described. The catalog includes safe-load tables, engineering details, layouts, and photographs illustrating applications.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 133.

This fleet economy can be yours!

THE Chicago & West Towns Railways, Inc. operate a fleet of over 200 buses. Despite punishing conditions of city operation, these fleet units are running up record mileage between overhauls. Back of their performance is a clue to lower maintenance costs for you.

In 1942, officials of this fleet switched their units to STANOLUBE HD Motor Oil upon the advice of a Standard Oil Automotive Engineer. The object was to stop deposit troubles. The results far exceeded that original goal.

"The problem of sludge in our engines has been eliminated," writes L. P. Reilly, superintendent of equipment. "Since we started to use STANOLUBE HD Motor Oil, we have extended our overhaul periods from 125,000 miles to approximately 175,000 miles. We attribute the highly satisfactory performance of our units to good maintenance practice and effective lubrication by STANOLUBE HD Motor Oil."

The advantages offered you by STANOLUBE HD are multiplied by an automotive engineering service that's unique in the Midwest. The Standard Oil Company has a specially trained and experienced lubrication specialist located practically at your doorstep. This man will give you "on-the-spot" engineering service that's vital to fleet operations. His headquarters are the nearest Standard Oil Company (Indiana) office. To obtain his assistance, contact that office or write:

Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois.

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STANDARD OIL COMPANY (INDIANA) STANDARD

EASY TO CARRY AND PLACE

EMBURY HIGHWAY TORCHES have THE EXCLUSIVE LUCK-E-LITE CHAIN
ORDER FROM YOUR DISTRIBUTOR
For more LUCK-E-LITE facts, write
EMBURY MANUFACTURING CO.
240 Allen Street, Warsaw, N. Y.

Three new Coles mobile cranes have been brought out recently. Here is a 6-tonner fitted with a 40-foot boom.

Three Mobile Cranes

Three new mobile cranes, with capacities of 1¾, 7½, and 15 tons, have been introduced by Coles Cranes, Inc., 4312 S. Paulina St., Chicago, Ill. Gasoline or diesel-powered, these cranes are designed to give easy clutchless operation with simple one-man control. All control units are independent and may be used simultaneously. A completely enclosed coupe-type cab placed over the controls provides complete vision. The cranes may be used with hooks, clamshells, or other special lifting attachments.

The patented reversible steering on the new units is designed to give normal steering irrespective of the boom position. A self-resetting limit switch on the hoist and boom-hoist motion is provided. An automatic safe-load indicator warns the driver of overload and stops the lift motion. Higher hoisting speeds automatically provide for lighter loads, the company says.

Booms are of the cantilever-type lattice construction. Standard lengths are 15, 17, and 30 feet for the 1¾, 7½, and 15-ton cranes respectively. Additional sections may be obtained to increase the total operating lengths to 20, 40, and 70 feet. These self-propelled models are mounted on pneumatic tires. Truck mountings may also be obtained.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 44.

Bulletin on Diesel Engines

Bulletin No. 5291, containing complete specifications of all automotive and industrial models of HR-400 Cummins diesels, has been announced by the Cummins Engine Co., Inc., Columbus, Ind.

These 4-cycle 4-cylinder diesel engines have a 5⅛-inch bore and 6-inch stroke, and a piston displacement of 495 cubic inches. HR-400 engines develop a maximum of 100 hp at 1,800 rpm, and are available in six models for use in all types of highway and off-highway automotive applications, as well as a wide range of industrial uses, including power units.

This literature may be obtained from the company, or use the Request Card at page 16. Circle No. 70.

New Side-Dump Body

A new side-dump truck body, featuring hydraulic dumping and a fully automatic down-folding side gate, has recently been announced by the Easton Car & Construction Co., Easton, Pa. Load capacities of 16 tons or more are available.

Operation of the gate on the new equipment is controlled by a leverage system. The door operating mechanism is completely enclosed for protection against falling stone. The gate opens flush with the floor as the body is raised for dumping and closes automatically as the body is lowered to riding position. When open, the gate provides a chute which carries the load clear of the tires. Three-sleeve telescopic hydraulic jacks, one at each end of the body, are used for dumping.

Easton's new BD-1116H side-dump truck body—with automatic drop door—has a capacity of 16 tons. This photo shows it mounted on an Autocar diesel chassis.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 76.

DIG HOLES FAST

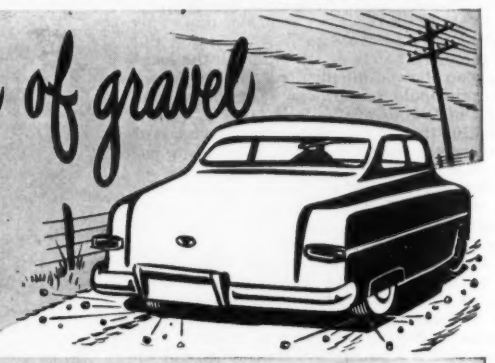
The Danuser Digger digs holes fast, straight and automatic—500 to 600 per day. Easily fitted to most popular tractor makes—built for rough, rugged jobs. One man operation; augers 4" to 24". Write Dept. D.

DANUSER MACHINE CO. Fulton, Mo.

DANUSER DIGGER

Also Manufacturers of the Famous Danuser All-Purpose Blade

Save $150 to $500 worth of gravel per mile with the SEAMAN MIXER



After ditch cleaning, the material is spread on the road. The SEAMAN then separates gravel from dirt and grass, salvages tons of gravel otherwise wasted.

The Seaman Self-Propelled Mixer. Gasoline or Diesel powered. 7 forward mixing speeds. Mixing width 7 feet.

Traffic ravels and scatters tons of valuable gravel from unstabilized road surfaces to the shoulders and side ditches.

Recovery of this gravel in the past has been impossible or far too costly; today, however, there's an easy and profitable remedy. When cleaning ditches and shoulders, blade the material to the roadway and use the SEAMAN (hood open) to separate gravel from the dirt and grass and to pulverize sod lumps. The sods are then bladed aside after separation.

Next, after scarifying and adding new gravel if needed, use the SEAMAN to mix it in for a safer, high load bearing, weather resistant road bed.

You'll quickly repay your investment in the SEAMAN in the gravel you save! Here are a few actual experiences — by way of proof!

Marshall Co. (Ind.) reports salvaging 100 to 300 yards of gravel per mile.

Seattle (Wash.) estimates savings of $100.00 per day in gravel construction.

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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Interpreting Contracts As to Scope of Project

THE PROBLEM: *Under a contract for grading for an aircraft assembly plant, was a grading and excavating contractor entitled to additional payment for work done in a Federal air-depot area?*

THE ANSWER: Yes. (Moorman v. United States, 82 Fed. Supp. 1010, decided by the United States Court of Claims.)

Plaintiff contractor sued the Government for $117,916.51 to cover grading and excavating 298,973 yards. He contended that this work was not covered by the original contract, and that it was worth more than 24 cents per yard, the unit price fixed in the original contract.

The contracting officer denied the contractor's claim on his interpretation of the contract documents. The Board of Contract Appeals, acting for the Secretary of War, affirmed the contracting officer's decision, and this suit followed.

The Court of Claims laid particular stress upon the fact that the contract specifications were so entitled as to indicate that they applied only to the assembly plant and did not mention the air depot, although the location plan showed the air depot. Summarized, the principal conclusions reached by the Court of Claims are as follows:

Making the specifications part of a standard Government contract form did not show an intention that they should override an explicit provision of the contract concerning the binding effect of decisions of the contracting officer and department board of appeals. So provision in the spex that the decision of the department head should bind the parties meant that it should be binding only so far as made so by the standard formal contract. Interpretation of the contract documents did not involve a question of fact as to which a departmental decision would be binding.

"The standard contract duly prepared and approved by the proper authority of the Government is binding upon the writer of the specifications covering a specific project, and such contract provisions control unless they are modified . . . by a proper provision, approved by proper authority, inserted in the article of the contract provided for that purpose. Otherwise, the standard contract itself would be of little if any use, and the uniformity of understanding among contractors, contracting officers, and others concerned, and the values flowing to the Government as well as to contractors by reason of such standard contract provisions, would not be obtained but would be left in a state of confusion and uncertainty. The history of the preparation and adoption of the standard forms of Government contracts shows that it was reasons such as above mentioned, among others, that led to the adoption of the standard contract such as we have here."

Lessee Liable for Trusses Rented to Brace Pile Coffer

THE PROBLEM: *As a culvert construction job progressed, pressure of sludge against a metallic piling cofferdam proved too great. To brace the piling, defendant contractor secured from plaintiff five steel spans or trusses. The rental contract specified that the steel was rented from plaintiff as cofferdam bracing for the construction period; that the contractor would disassemble the trusses, pay $2,500 as rental, return "all steel in good condition, less ordinary wear and tear inherent to such type of work, and would pay $59 per ton for all steel that the contractor could not return."*

Was the contractor liable at that rate for any steel that it did not return and for unacceptable steel, less the amount for which the latter was sold as junk?

THE ANSWER: Yes. (Venice v. Frazier Davis Construction Co., 87 Fed. Supp. 475, decided by the United States District Court, Canal Zone, Balboa Division.)

First, the court noted that the case was governed by these basic rules of law: A lessee of chattels is bound to use at least ordinary care to avoid injury to them. By special contract the responsibility may be increased, even to the extent of making the lessee absolutely liable for loss or damage. But to impose such increased responsibility, the mutual intention of the parties must be clearly expressed. Ordinarily, mere promise to return a chattel does not impose greater responsibility than the exercise of ordinary care. But the court said that the contractor, by agreeing to pay $59 per ton for steel not returned, enlarged its obligation.

The court viewed the evidence in the case as showing that the contractor put the trusses to more damaging use than was contemplated by plaintiff, and said: "Ordinary 'wear and tear' does not mean total destruction of the material, or in this case the steel beams rented for use by defendant, but includes reasonable wear and tear by depreciation in value . . . as may arise from ordinary and reasonable use. The steel in question was used by defendant in a most unreasonable manner; it was cut and recut, spliced and respliced." The court said that if the contractor intended "to cut and recut the steel beams . . . and to place them under such strain as to cause them to buckle and bend, and destroy their future use, then defendant should have protected itself by inserting in such a contract stipulations to absolve itself against such contemplated use."

Previous Experience Made Bidding Prequalification

THE PROBLEM: *Under statutory requirement, Philadelphia was bound to award an incinerator and garbage-plant construction contract to the lowest responsible bidder, under regulations provided by ordinance. An ordinance empowered the Director of Public Works to secure information from bidders as to their ability to perform. Specifications called for bids for construction embodying alternative types of incinerators, and each bidder was required to show that he or a named subcontractor had designed and constructed a plant of each type in operation for at least two years. Did imposition of that requirement invalidate a contract awarded to the successful bidder as an arbitrary and unreasonable suppression of competitive bidding?*

THE ANSWER: No. (Corcoran v. City of Philadelphia, 70 Atl. 2d 621, decided by the Pennsylvania Supreme Court.)

The court distinguished the case from an earlier one in which it had decided that the authorities of the same city established bidding conditions that permitted favoritism. (Harris v. Philadelphia, 299 Pa. 473, 149 Atl. 722.)

Referring to that case, the court said: "There the prequalification plans gave municipal officers the power to finally determine, without review" by any board, "that some bidders were entitled to submit proposals, while other bidders were compelled to appeal

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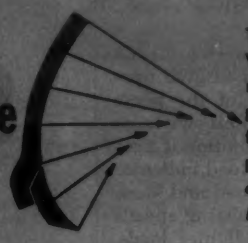

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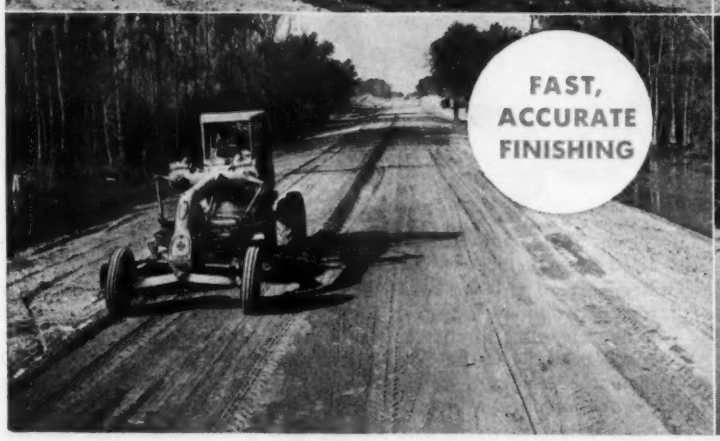

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and convince a board of review that they were qualified. Such method clearly was conducive to favoritism. The prequalification requirements in the present case were unobjectionable. All bidders were subject to the same tests. The requirements were reasonable in that they provided a means to determine in advance who were qualified bidders."

Suspended Road Job Flooded

THE PROBLEM: *A highway job was about 77 per cent complete on November 1, completion being due December 1. The State consented to suspension of work until spring. In March, river overflow damaged an embankment on which the highway was being constructed. The contractor, claiming that the State was at fault in failing to provide adequate drainage facilities, demanded a supplemental contract to cover restoration work and refused to proceed when the State rejected the demand. The State relet the uncompleted work and the successor contractor repaired the flood damage for about $4,000. The State paid $221,-516.43 for work done by the first contractor whose assignee sued to collect damages from the State on a theory that it broke the contract as to the uncompleted work. Was the suit properly dismissed?*

THE ANSWER: Yes. (Michael v. State, 93 N. Y. Supp. 2d 234, decided by the Appellate Division of the New York Supreme Court.)

The court, by a three-to-two vote, approved a decision of a lower court to the effect that the highway was not improperly designed, and that the contractor was not justified in refusing to proceed with the work because of the dispute as to liability for restoring the damaged work.

The two dissenting judges reasoned: A finding that the highway was not improperly designed did not exonerate the State, which was bound to foresee the flood though not bound to foresee the damage. Since it was extra work, "the contractor was not obliged to risk its demanded performance under protest and later take his chance of recovering payment therefor. When the State directed its performance, the contractor rightfully demanded a supplemental contract, and in refusing it the State breached its engagement", thereby justifying the contractor in suing.

Workmen's Compensation—Award Made for Assault

THE PROBLEM: *An underboss on a road job refused to punch a ticket for delivery of a truckload of gravel because the driver had not dumped the gravel in the manner directed. A quarrel ensued when the underboss told the driver to consult the boss, and without provocation the driver knocked the underboss down and struck him with a shovel. Was the injured man entitled to an award under a statute providing for compensation for injuries sustained in the course of and growing out of employment?*

THE ANSWER: Yes. (Correia v. McCormick, 154 Atl. 276, decided by the Rhode Island Supreme Court.)

The court reasoned: The direct cause of the injury was the injured man's strict adherence to duty and his compliance with his employer's orders. This was not a mere private quarrel between the two men, for which no award would have been proper. "Had the petitioner [the injured man] punched the ticket giving the truck driver credit for a load dumped in violation of orders, there would have been no assault and no injury."

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Model	Brake Hp.	Weight
AD-4	104	22,140 lb.
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Outstanding feature of Federal's new Style Liner series of trucks is the "swing-lift" fender. Both front fenders can be raised up on a concealed hinge, giving maximum accessibility to the engine, accessories, steering, and brakes.

New Line of Trucks

A new series of light and medium-duty commercial vehicles has been announced by the Federal Motor Truck Co., Detroit 9, Mich. The 10 models are available with gross vehicle weights up to 21,500 pounds, tractor-trailer weights up to 42,000 pounds, and eight wheelbase lengths ranging from 126 inches to 250 inches. Cab-to-axle dimensions are from 60½ to 174½ inches.

The Style Liner cab is 66½ inches wide at shoulder height and 77 inches wide at the bottom, and is of all-steel welded construction with a one-piece top. Driver vision has been increased through the use of a one-piece full-width bent windshield of safety plate glass.

Paramount feature is Federal's new "swing-lift" fender which offers accessibility to the engine, accessories, steering, and front brakes. Elimination of fender obstruction and a large side-lift hood permit the mechanic to get at working parts. A hinged push-button panel on the instrument board gives full accessibility to electrically operated gages. All electrical circuits are individually fused.

Mechanical improvements in the Style Liner series include a wider-track front axle and narrower wheelbases for shorter turning radius. There is a choice of several axles of varying capacities and ratios in single-speed, two-speed, and two-speed double-reduction final drive. There is also a choice of four high-torque truck engines with ratings to 131 hp. Engine features include full-pressure lubrication, positive crankcase ventilation, copper-lead main and connecting-rod bearings, and seven bearing tocco-hardened counterweighted and balanced crankshafts. Vibration dampers are also standard on larger engines.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 83.

Multi-Purpose Hose

A new all-service hose has been announced by the Hewitt Rubber Division of Hewitt-Robins, Inc., 240 Kensington Ave., Buffalo 5, N. Y. Servall hose simplifies inventories, the manufacturer says. Instead of having separate lengths of different kinds of hose on hand to serve specialized purposes, you can keep only one reel of hose on hand and cut off lengths as needed for air, water, gasoline, oil, or low-pressure spray requirements.

Further information may be secured from the company by requesting Bulletin No. 137. Or use the Request Card at page 16. Circle No. 24.

Heat-Resistant Paint

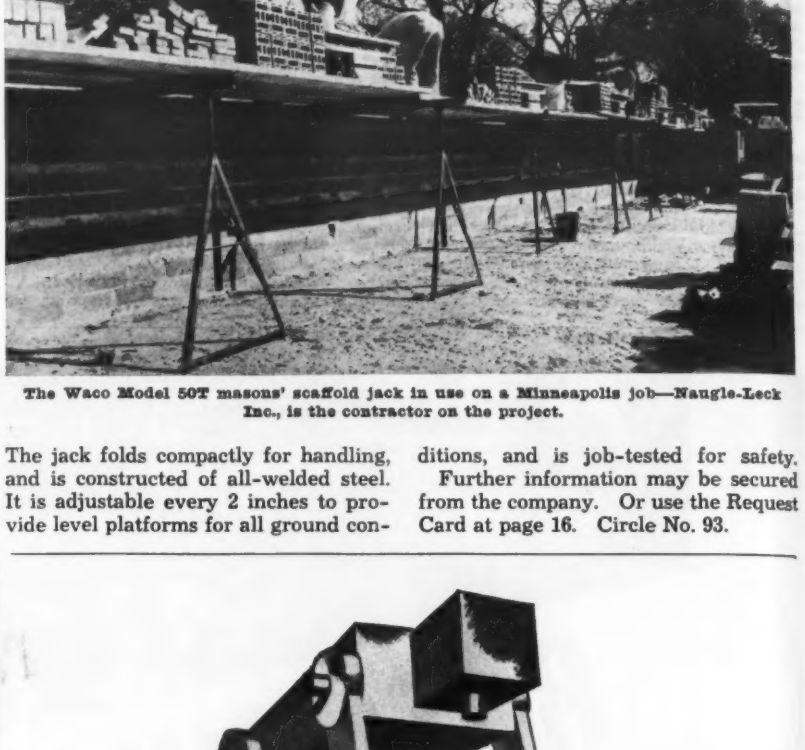
A heat-resistant aluminum paint for use on heat lines, radiators, condensers, compressors, ovens, exhaust manifolds, engine heads, mufflers, etc., is manufactured by Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio.

Heat-Rem is made for use on exterior and interior metal surfaces where a temperature range of 1,000 to 1,500 degrees F is encountered. It fuses with the surface metal, says the manufacturer, to form a bright elastic finish resistant to moisture, corrosion, mild acids, alkalis, and industrial fumes. It is said to set in 4 hours and dry completely overnight.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 22.

New Scaffold Jack

A new masons' scaffold jack designed for brick and stone work, and cinder and concrete-block laying, has been introduced by Wilson-Albrecht Co., Inc., 3569 Wooddale Ave., Minneapolis 16, Minn. The Waco jack is available in 3 models with a vertical adjustment of 4 feet to 6 feet 8 inches. Ledger lengths of 50, 62, and 72 inches are available.



The Waco Model 50T masons' scaffold jack in use on a Minneapolis job—Naugle-Leck Inc., is the contractor on the project.

The jack folds compactly for handling, and is constructed of all-welded steel. It is adjustable every 2 inches to provide level platforms for all ground conditions, and is job-tested for safety.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 93.

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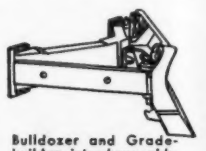
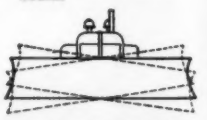


Bulldozer and Gradebuilder *interchangeable*: just *bolt* the necessary blade to the standard push-beams.



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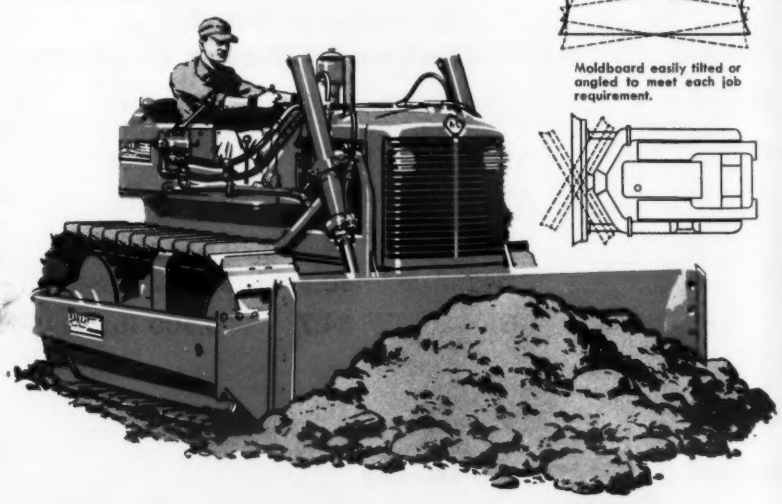

P.S.: Baker is the PIONEER and the SPECIALIST in bulldozers

Traveler-Crane Team Erects Bridge Steel

Four Temporary Bents Are Used by American Bridge Company on Superstructure Contract in Maine

✦ LATE last year the new 2,092-foot highway bridge across the Kennebec River in Augusta, Maine, was opened for traffic following the completion of the superstructure and deck-paving contracts. The Maine State Highway Commission sponsored this $3,200,000 high-level span project which connects the high banks on opposite shores of the state capital. Two Federal highways, U. S. 201 and U. S. 202, are carried on the modern structure which now eliminates heavy traffic congestion at the old low-level bridge crossing the river in the downtown business section of the city.

The final work on the substructure—two abutments and ten piers of reinforced concrete—was completed in July, 1949. (See C.&E.M., July, 1949, pg. 72.) W. H. Hinman, Inc., of North Anson, Maine, did the job for a low-bid price of $376,921. Steel erection began in March, 1949, over some of the completed substructure, and was finished in October. The fabricating and erecting was done by the American Bridge Co., with offices at Boston, Mass., under a $1,063,056 contract from the Highway Commission. Designed for H-20 S16-44 loading, the bridge has a 28-foot roadway and two 6-foot sidewalks protected by a wrought-iron railing. The roadway is a 6¼-inch reinforced-concrete slab covered with a 2-inch surface course of bituminous concrete, and crowned with a 3-inch slope in 14 feet.

The 11 spans are numbered from west to east across the bridge; 50-foot span 1 is between abutment 1 and pier 1, and so on, with end span 11 connecting pier 10 and abutment 2. The first seven spans, west to east, measure 50, 250, 300, 350, 300, 250, and 116 feet 5 inches; the next three spans measure 117 feet 10 inches; and the eleventh measures 116 feet 5 inches. Span 1 is a 50-foot I-beam span. The next five spans, totaling 1,450 feet, are deck arch trusses, with the largest being 350 feet between piers 3 and 4. The remaining five spans, from pier 6 to abutment 2, are of plate-girder construction. The river channel, 67 feet wide, passes between piers 2 and 3. Vertical clearance at mean low water is 74.4 feet, while the finished grade of that span is 100 feet above the water.

The deck arch trusses are 25 feet apart on centers. They are 50 feet high over the piers, and 18 feet at the center of the spans. Across their tops go 33-inch WF 130-pound floor beams into which are framed five longitudinal I-beam stringers on 7-foot centers. Supported at the ends of the floor beams are steel longitudinal channels on which the sidewalk is laid in cantilever construction.

Steel Handling

Bridge steel was shipped by rail from the Elmira, N. Y., shop of the contractor to a siding of the Maine Central Railroad at Waterville, Maine, 20 miles north of Augusta. Shipment could not be made directly into Augusta because the long, heavy members could not be moved around the corners of some of the streets of the state capital. First to arrive were the ten 118-foot girders for the five spans—7, 8, 9, 10, and 11—at the east end of the bridge. The girders are 8 feet 6 inches back to back and weigh from 36 to 41½ tons each. A Bay City 60-ton locomotive crane with a 60-foot boom unloaded the steel in Waterville onto trailer trucks of the Kennebec Transportation Co. of Augusta, which hauled it down the east side of the river to the eastern bridgehead.

The smaller steel pieces were sent to the Gannett siding of the Maine Central, just north of Augusta on the east bank of the Kennebec, where they were unloaded by a Manitowoc 20-ton Speedcrane equipped with a 65-foot boom. Another Manitowoc Speedcrane, a larger 50-ton model with a 90-foot boom, unloaded the long girders when they arrived at the east end of the bridge. A 20-foot jib was later added to this crane, increasing its boom length to 110 feet for the erection of the girders. Spans 9, 10, and 11 were thus erected from the ground. An American Bridge Co. traveler was then set up over span 9, the third span from the east end. The traveler on top and the 50-ton crawler crane on the ground then erected the girders for spans 7 and 8, completing this portion of the superstructure west to pier 6.

In the meantime the 20-ton crawler crane had erected the steel for 50-foot span 1 on the west side of the river. Steel for spans erected from the west side of the project was brought in on Maine Central tracks which ran along that side of the river under span 2 of the new bridge. When span 1 was completed, another traveler was set up on top of it. The remainder of the superstructure, the deck-arch-truss spans 2, 3, 4, 5, and 6, was then erected from the west and east ends simultaneously.

Two Travelers

The two American Bridge S4 travel-

(*Continued on next page*)

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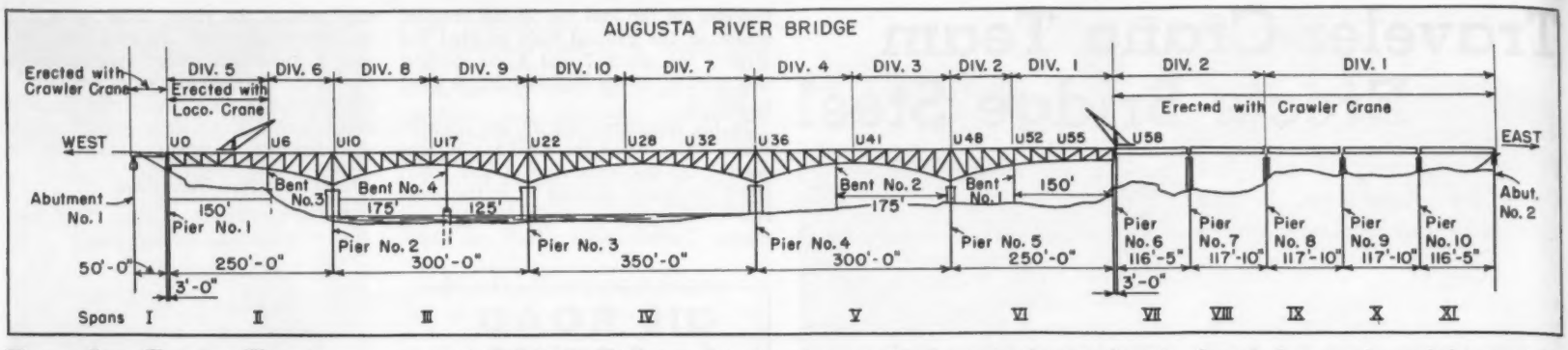


Traveler-Crane Team Erects Bridge Steel

(*Continued from preceding page*)

ers had 65-foot booms and are rated at 30-ton capacity; when boomed out to 50 feet they lift 15 tons. They were operated by a 2-drum gasoline-engine hoist, and were anchored to the floor beams of the superstructure with U-bolts and cables. On the west side the locomotive crane with its boom length increased from 60 to 85 feet lifted the steel members from the railroad cars to the deck. There they were placed on a push car that was moved out to the traveler by a tugger hoist and cable.

From the bank on the east side of the river, near pier 4, a timber trestle had been built by the substructure contractor for the construction of pier 3 out in the Kennebec. It was just north of the bridge. This temporary structure was left in place and used by the superstructure contractor for hauling out the steel to the traveler working from the east side of the river.

Four temporary bents were erected in the construction of the five arch spans. Only the longest, 350-foot span 4, the center arch, was built without a work bent. Bent 1, 150 feet west of pier 6, and bent 3, 150 feet east of pier 1, were built of timber falsework. Bent 2, 175 feet west of pier 5, and bent 4, 175 feet east of pier 2, were of steel construction. Bent 4 in the river was built with sixteen 14-inch 120-pound H-piles, 75 feet long, supporting a grillage of 36-inch I-beams. The bent was 57 feet high above the grillage, which in turn was 29 feet above the river bottom.

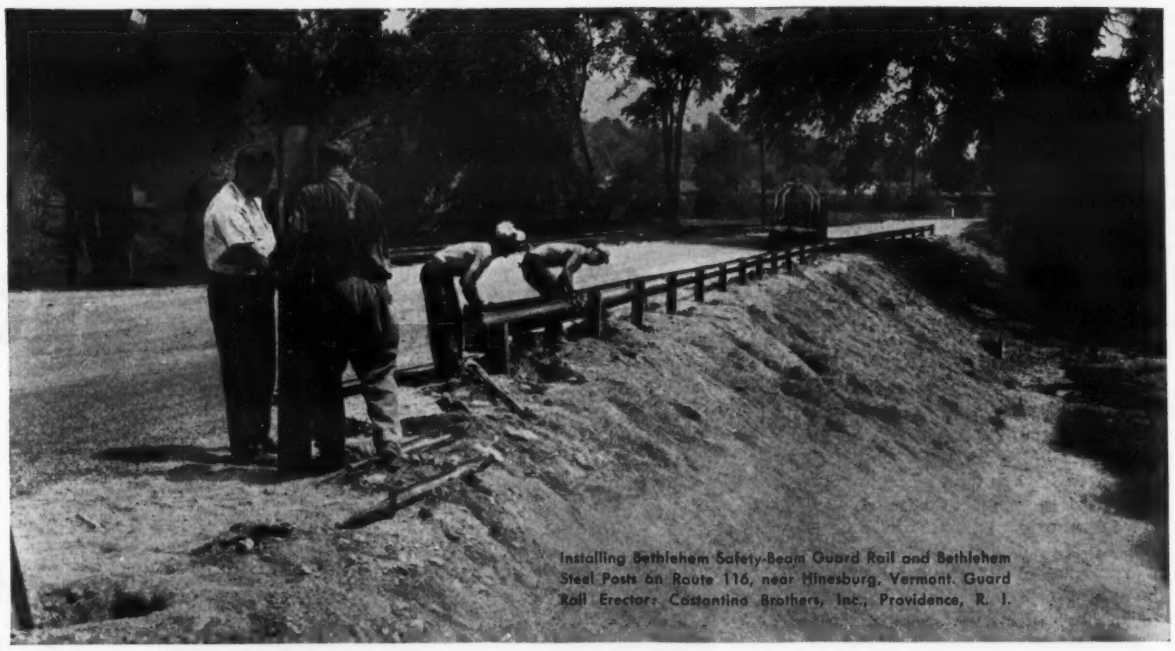
All the temporary bents were 28 feet wide. Bent 2 was 69 feet high from the grillage, while timber bents 1 and 3 were 53 and 30 feet high respectively. As many as four hydraulic jacks, 300 to 500-ton capacity, were used at these bents to lift the trusses precise distances in obtaining the proper amount of camber during the erection.

Erection Procedures

In erecting steel from the east side, the traveler and large crawler crane were both used in the 150-foot cantilever section from pier 6 out to bent 1. In the work over the ground, the trusses were mostly assembled and riveted on the bank, then raised into position. This was followed by the placing of the sway bracing, floor beams, bottom and top laterals, and stringers by the traveler. The traveler then cantilevered out the remaining four panels, or 100 feet, to pier 5. From pier 5 the traveler worked out span 5, 175 feet to bent 2, then cantilevered the remaining 125 feet to pier 4. Lighter pieces, such as the pipe railing, were set by the crawler crane with the 90-foot boom and 20-foot jib extension.

Moving over now to the west side of the river, the 150-foot section of arch from pier 1 to bent 3 was erected by the locomotive crane. This portion of span 2 crossed the busy tracks of the Maine

(*Concluded on next page*)



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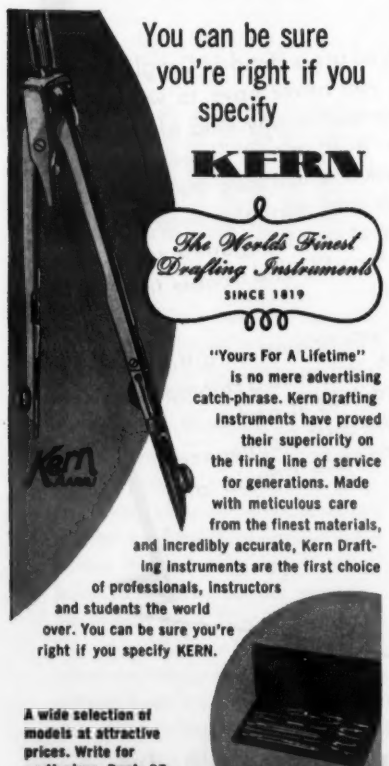

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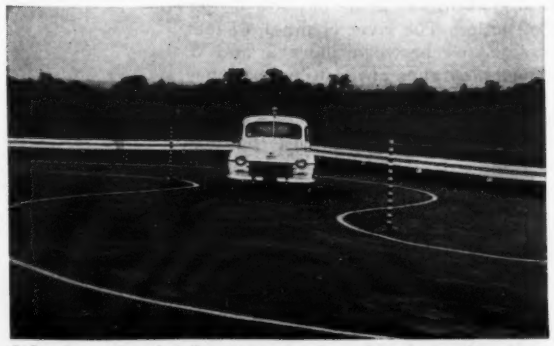
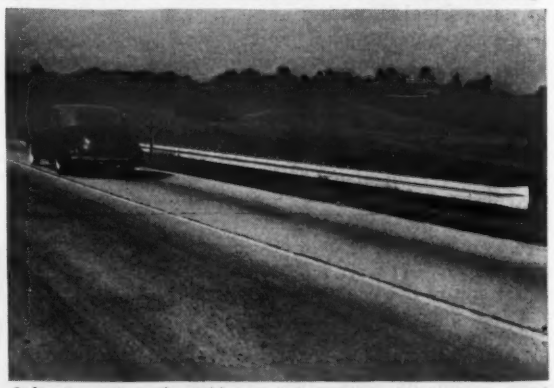
Our Folder 545 gives detailed information about Safety-Beam Guard Rail. Ask the nearest Bethlehem sales office for a copy, or write to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation



Safety-Beam Guard Rail protects cars from damage on this unique course for new drivers, which is operated at Harrisburg, Pa., by Pennsylvania State Police. Guard Rail Erector: L. S. Lee & Son, Harrisburg.



Safety-Beam is easily visible at all hours, even despite heavy weed growth. This typical installation is located on Route 8, near Canton, Ohio. Contractor: Lewis and Frisinger Co., Ann Arbor, Michigan.

STEEL FOR HIGHWAYS

Dowel Units • Reinforcing Bars • Bar Mats • Guard Rail
Guard Rail Posts • Wire Rope and Strand • Pipe
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BETHLEHEM STEEL

Central entering Augusta. The two trusses, each weighing about 58 tons apiece, were assembled on the ground and laid out parallel to the tracks just south of the bridge. At 6 o'clock on Sunday morning, July 17, the 60-ton locomotive crane, working from a special construction track so that it would not have to boom out more than 16 feet in lifting, raised the upstream 150-foot truss into position. This important move was completed within an hour.

After two passenger trains had passed, the locomotive crane rolled approximately 22 feet southward, and at 10:15 a.m. started to lift the downstream truss. At 11 a.m. the other truss was resting securely on its bearings. The rest of the steel was erected without incident, and without delay to train service over the tracks below the span. The remaining four panels, or 100 feet, of span 2 were then placed by cantilevering out from bent 3 to pier 2. The 300-foot span 3 from pier 2 to pier 3 was erected next by working out first to temporary bent 4, and then completing the remaining five panels or 125 feet to pier 3.

Center 350-Foot Span

This left only the center 350-foot span 4 open. The fourteen panels at 25 feet each were numbered from panel point 22 over pier 3 to panel point 36 over pier 4. From the west the traveler cantilevered out four panels, or 100 feet, to panel point 26. A similar operation was performed from the east with the other traveler stopping at panel point 32. This left a 150-foot suspended span at the center. This was erected in the following manner:

With the front of the east traveler at U32, trusses and bracing were completed to U30, and the floor system out to U31. Then with the front of the traveler at U31, trusses were erected to U28. Vertical U28-L28 members were omitted from this operation and erected later with the west traveler. The east traveler was then pulled back to U36 over pier 4. With the front of the west traveler at U26, trusses U26 to U28 were erected by handling each member directly into place. The verticals U28-L28 were erected first.

Approximately ¾-inch to 1-inch jacking was required at L32 to fit up joints at U28 and L28. Jacking brackets for the 500-ton hydraulic jacks were provided on the bottom chords. The suspended span was swung before the remainder of the floor and bracing was filled in.

As the steel was placed it was bolted up by Chicago Pneumatic impact wrenches and then riveted with CP No. 90 hammers. Air was provided by three CP compressors—one at 315 cfm and two at 105 cfm. From two to three riveting crews of 4-men each were employed in the riveting. The total force on the steel erection numbered from 40 to 50. The steel in the superstructure totals 6,192,000 pounds. A. E. "Buck" Wotring was Superintendent for the American Bridge Co.

Deck Paving

A contract for the 6¼-inch reinforced-concrete deck slab, covered with 2 inches of bituminous-concrete surfacing, was awarded to Ellis C. Snodgrass, Inc., of Portland, Maine, on its low bid of $175,532.25. Prefabricated wooden form sections, ⅞ inch thick, were hung from the steel I-beam stringers by wire saddles, and also supported on 2 x 6 jacks set along the flanges of the beams on 18-inch centers.

Transit-mix concrete was supplied by V. E. Dunn & Son of Augusta, who used four truck-mixers in furnishing the material—a Ransome 5-yard, a Jaeger 3-yard, and two Jaeger 2-yard units. Dragon air-entrained cement was used in the mix. The reinforcing steel was furnished by the Bancroft & Martin Rolling Mills of Portland, Maine, which also fabricated the wrought-iron railing of the new bridge.

C. & E. M. Photo

From the east bank of the Kennebec River, pier 4 of the Augusta Bridge at the left, pier 5 at the right, and steel-erection bent 2 in the middle. A Manitowoc Speedcrane with a 90-foot boom and 20-foot jib handles light steel.

The concrete was discharged from the truck-mixers into a Rex Pumpcrete machine, or if the hopper could not accommodate all the mixers, then five 1-yard bottom-dump concrete buckets were available to hold the concrete. A Lima ¾-yard crane with a 50-foot boom emptied the buckets into the hopper as required. The concrete was pumped an average of 600 feet through a 6-inch pipe, before the Pumpcrete machine, a portable unit on rubber tires, was moved ahead. Concreting started at the east end and proceeded westward, as alternate panels were poured.

From the pipe line, which was laid along the right hand or north walk, the concrete was discharged into a deck hopper mounted on a "go-buggy" and from there was chuted out to the sides. The "go-buggy" consisted of a steel frame that moved along on four rubber-tire wheels which ran in channels spot-welded to the steel stringers on a 14-foot gage. This carriage was at the center of the 28-foot deck and easily distributed the concrete in the middle and to the sides of the forms as it advanced. Additional lengths of pipe were attached as the pouring moved away from the Pumpcrete. The concrete was cured with water from a soaker hose.

Paving was completed last fall in time for the opening of the bridge in November, but the bituminous-concrete surfacing was not done until this spring. The major items in the paving contract included:

Bituminous-concrete surfacing	700 tons
Concrete	2,375 cu. yds.
Reinforcing steel	435,300 lbs.

W. A. Libby was Superintendent for Ellis C. Snodgrass, Inc. For the Maine State Highway Commission, Andrew Adams was Resident Engineer on the bridge project. The Commission is headed by Lucius D. Barrows, Chief Engineer. Max L. Wilder is Bridge Engineer.

Turner Advances Bush

Vincent G. Bush is now a General Superintendent at the Philadelphia office of the Turner Construction Co. His duties will supplement those of Langley S. Homer, who has been a General Superintendent at Philadelphia for several years. Mr. Bush has been with Turner since 1928.

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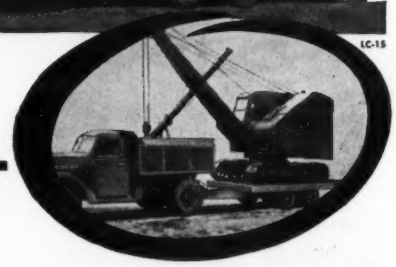
Tilting Trailer
cuts hauling costs!

Capacities: 13, 16 & 20-tons



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America's Favorite LOW BED TRAILER

The Multico mixer is made in 3, 5, 7, and 12-cubic-foot capacities; its discharge door is at wheelbarrow height.

New Portable Mixer Made in Four Sizes

A new portable multi-blade mixer in 3, 5, 7 and 12-cubic-foot capacities has been introduced by the Multiplex Machinery Corp., of Elmore, Ohio.

The Multico mixer is powered by electric motor, or gasoline or diesel engine. Mixing time is 3 minutes or less for mixes of plaster, concrete, or other aggregates, the company says. The unit is complete with a discharge door located at standard wheelbarrow height. Special platforms, rigs, etc., are not necessary. Replaceable liners and paddles of high-carbon steel are designed to reduce maintenance problems. Shafts operating in antifriction bearings have Alemite lubricating units.

The mixer is of steel-plate welded construction and is mounted on a welded-steel truck with 4 standard pneumatic-tired automobile wheels. A towbar is provided on the steerable front wheels.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 36.

Magnetic Sweepers Clear Roads, Yards

A line of permanent non-electric magnetic sweepers, designed to save tires and "downtime" on rolling stock, has been developed by the Homer Mfg. Co., Inc., of Lima, Ohio. These sweepers save pneumatic tires, labor, and production time by keeping loading areas, yards, and roads free from nails and other steel trash.

The Homer sweepers are available in three models: the standard model for service on smooth surfaces has a clearance of ¾ inch; the heavy-duty model for service on semi-rough areas has a clearance of 1¾ inches; the high-intensity model is for service in rough areas where a clearance of 2½ inches is required. These units are available in two types; the Homer hand sweeper and the Homer road sweeper, with sweep sizes ranging from 12 to 72 inches. They may be pushed or pulled by hand, or by any motorized vehicle.

The sweeper consists of a series of Homer permanent Alnico magnets mounted on an alloy axle with rubber-tired ball-bearing wheels. A canvas cover, one end fastened to the retainer pan and the other end passing over the assembly and under the magnets, is held in place by a rod attracted to the magnet faces. Nails and other ferrous materials are attracted to the magnets as the sweeper is rolled along. When the magnets are loaded, the operator pulls the canvas free, causing the accumulated metal to drop into the retainer pan where it is carried until a suitable dumping place is found.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 86.

For high dumping—the new Type HL Model 100 Dempster-Diggster. The bucket has a 13½-foot clear height from the ground.

Shovel and Loader Dumps at 13½ Feet

The new Type HL Model 100 Dempster-Diggster has a 13½-foot clear height when fully raised, according to a recent announcement by Dempster Bros., Inc., Knoxville, Tenn. This automotive hydraulic shovel and loader is available with four buckets—a 1 or 1¼-yard digging bucket and a 1½ or 2-yard loading bucket. The unit has a crowd reach of 10 feet 6 inches and either rubber-tire or crawler-type traction.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 57.

Portable Washing Plants

An 8-page bulletin giving complete information, with schematic flow diagrams, on portable washing plants has been prepared by Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee 14, Wis. Bulletin No. 1650 includes data on the capacities and specifications of the plants and provides dimensional tables and dimensioned drawings. A double-page schematic drawing and flow diagram illustrates the entire operating mechanism of the unit. On-the-job photographs show a variety of installations.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 92.

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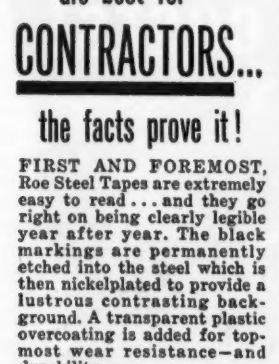
STEEL TAPES
are best for
CONTRACTORS...
the facts prove it!

FIRST AND FOREMOST, Roe Steel Tapes are extremely easy to read . . . and they go right on being clearly legible year after year. The black markings are permanently etched into the steel which is then nickelplated to provide a lustrous contrasting background. A transparent plastic overcoating is added for topmost wear resistance—and durability.



A—Steel tape
B—White nickel
C—Black etched markings
D—Plastic overcoat

Pictured here is the Roe Steel Tape #302 with polished chromeplated, sturdy welded steel case. Other Roe models feature cases in handsewn leather, and in metal-banded leather and leatherette. They have a reinforced rust resistant liner, precision winding drum, flush-folding handle, press button center and roller mouthpiece. All are available with 25, 50, 75 or 100-foot tapes; feet in inches and eighths, or in tenths and hundredths.

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Contractors everywhere are buying where they can do the best. As one contractor recently remarked:

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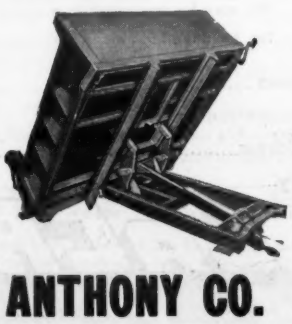

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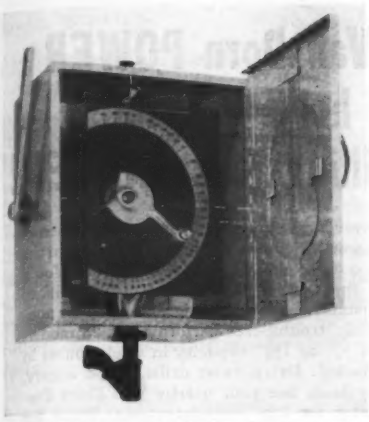

Techkote's new Mach (pronounced "mock") automatic dispenser for air-entraining agents operates on the principle of passing liquid by gravity flow through a bladder.

Automatic Dispenser For Liquid A-E Agent

The new Techkote Mach automatic dispenser for air-entraining agents passes the liquid agent through a bag which is alternately opened and closed at top and bottom by a tripping mechanism. This release can be actuated by hand, or by mechanical means in connection with the water discharge to the concrete mix.

According to Techkote Co., Inc., 821 W. Manchester Ave., Inglewood, Calif., no internal moving parts of the dispenser work in the air-entraining agent; there are no air vents, no pistons, no packing glands or nuts; no gumming occurs; and no lubrication is required. The quantity discharged can be dialed in units of 3 to 40 ounces. All working parts are made of stainless steel. Other metallic parts are treated for prevention of corrosion and rust. The bearings are Oilite bronze.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 108.

Electrode Coatings Enable AC or DC Use

New ac-dc coatings for several electrodes formerly limited to dc application have been announced by the Stoody Co., 11934 E. Slauson Ave., Whittier, Calif. Among these are Stoodite, Tube Borium, and Borod. The ac-dc coated rods do not replace the older dc types, but are additions to the regular Stoody line. To differentiate between the two types, the new rods are preceded by the term "ac-dc".

The development of ac-dc coatings makes all Stoody alloys available for ac and dc work except Tube Stoodite, a strictly oxyacetylene rod. The distinguishing feature of the new coatings is their graphite-type base, which eliminates slag interference and produces an exceptionally stable arc, the company says.

The ac-dc Stoodite deposits have approximately the same properties as the regular coated Stoodite: penetration is slightly lower, Rockwell hardness C-56; they possess high resistance to abrasion as well as to galling and pitting; they polish under abrasion.

The ac-dc Tube Borium contains uniformly sized particles of Borium (pure tungsten carbide) in mild-steel tubes. It is slightly faster in deposition rate and possesses a more stable arc than standard Electric Tube Borium. All other characteristics are the same. Suitable applications include earth-cutting and earth-moving equipment where abrasion is severe.

The ac-dc Borod, similar in construction to Tube Borium but containing finer Borium particles, duplicates the deposit and wear-resistance characteristics of the standard dc-applied rod, but excels slightly in speed of deposit and stability of arc. It also provides wear resistance to earth-working and scraping equipment, particularly on thin or small sections.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 48.

Kent's M. E. Handbook

A new edition of Kent's "Mechanical Engineers' Handbook" has been published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Comprising two separate, inclusive volumes, the new Kent reflects the developments in mechanical engineering that have come about since the eleventh edition was published in 1936.

Volume I, called "Design and Production", has been edited by Colin Carmichael, Editor of *Machine Design;* Volume II, called "Power", was prepared under the supervision of J. K. Salisbury, Division Engineer, Thermal Power Systems Division of the General Electric Co. Approximately 3,000 pages long, the handbook is priced at $8.50 per volume.

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on any *location*
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Land-Service Roads: A Texas Specialty

Lone Star State Relieves Back-Country Situation by Building 2,236 New Miles In One Year

By RAYMOND P. DAY,
Western Editor

✦ D. C. GREER, State Highway Engineer of Texas, once defined a farm-to-market road as "any road that hasn't been built".

That definition, of course, was given in fun. Actually, Greer's department is leading the nation in programming farm-to-market construction. Last year $21,480,000 was spent to construct a mammoth 2,236 miles. In 1948 mileage was 2,252, with the money figure approximately the same.

This year in the first 2½ months, 869 miles costing $8,452,000 have been placed under construction. The May letting alone was expected to run about $5,000,000, including 454 miles in 79 projects.

Farm-to-market and secondary construction in Texas is noteworthy even aside from the magnitude of this work. Interesting trial-and-error research is being done on these roads where not so much money is at stake. The engineers call is "blundering" . . . but they are proving that interesting exceptions to general road-building rules can happen.

For example, the usual PI limit on caliche is 15. Beyond that it isn't considered fit for base-course work. Several years ago, driven to desperation by a shortage of good caliche, they used material with a PI of 24. Theoretically the road was a goner before they cut the ribbons. It didn't work out that way. The road held up fine.

Why?

Engineers admit frankly that they don't know, yet. And they certainly are not using 26-PI caliche willy-nilly —or even recommending that practice. But by using the low-cost secondaries as experimental proving grounds for the higher-type highways to come, Texas engineers believe much can be learned.

The state's geographic and climatic spread poses so many problems that the result, so far as farm-to-market roads are concerned, is a variety of construction. There is all manner of flexible base, soil-asphalt, soil-cement, portland-cement concrete, asphalt-penetration surface treatment, and several types of bituminous construction.

Problem Has Long History

The need for better rural roads has been critical even longer than Texas has been a state. Prior to 1941, counties were responsible for strictly local roads. Limited work on these had been done by counties and various depression-era agencies. The Texas Highway Department also improved some mileage, and then turned it over to the counties for maintenance. That didn't work too well. Results were spotty, depending on the ability of the supervisory maintenance personnel.

The situation deteriorated, and by 1941 had become serious. Texas' back roads needed help.

That was the general situation when, in 1941, the Texas State Highway Commission "designated" the first farm-to-market road. By careful planning, prompt maintenance, and strict economy on the primary highway system, it became possible to expand the state network to include a significant mileage of roads second in importance only to the primary routes. This group of roads would naturally have less intercity traffic and more land-service value.

Using its past experience to good advantage, the Commission then adopted a policy of constructing farm-to-market roads and perpetuating the improvements by the application of state maintenance. By this procedure, two results were hoped for. It was believed that permanent relief would be given to a majority of the users of local or land-service roads, and that a reduction in the mileage dependent on county funds would eventually eliminate the "thin spread" of those funds.

The stage was set for today's high-speed contracting on April 1, 1945, when a new division of the Highway Department was created. It was called the Land Service Roads Division. Currently under the leadership of B. B. Freeborough, the new department has

(*Continued on next page*)

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Wherever you're drilling holes, in construction work or equipment maintenance, turn the jobs over to Van Dorn Electric Drills! You'll find them easier to handle; sturdily built to withstand rough usage; high-powered for non-stalling, trouble-free performance. 25 models from ¼" to 1¼" capacity in steel, double in hardwood. Drive twist drills, wood augers, Hole Saws. See your nearby Van Dorn Distributor for free demonstrations. Write for detailed catalog to: THE VAN DORN ELECTRIC TOOL CO., 787 Joppa Road, Towson 4, Md.

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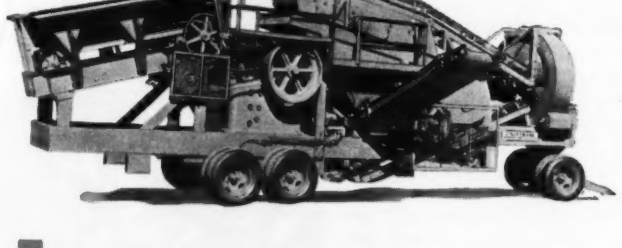

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Universal "Stream-Flo" engineering does it with the TwinDual Method—the modern system of crushing and screening that gives three full stages of reduction with only two crushers. You get more production, less jaw and roll shell wear, longer life, less maintenance.

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grown in stature.

Program Includes FAS Work

Federal-Aid secondary work is a part of the land-service road program. In 1949, some 1,317 miles were of this type of construction. About 342 miles were paid for outright by the state, and 577 miles were constructed under the Texas "75-25" arrangement, by which the counties put up 75 per cent of the construction cost and the state puts up 25 per cent, furnishes the engineering, and shoulders full responsibility for all future maintenance and replacement costs.

A Busy Division

The Land Service Roads Division is one of the busiest in the Highway Department. It is comprised of 20 persons, including Freeborough. These 20 people handle a multitude of details. In a year's time, for example, there are about 20,000 bid proposals to prepare and assemble, but the assembly is only one man's work.

Emphasis in the division is on engineering and design. The first section, headed by Senior Design Engineer R. J. LaFrentz, takes care of engineering and design for east, central, and south Texas. A second design section, headed by Senior Design Engineer W. F. Gustafson, handles north, northeast, and northwest Texas. The work of these two sections is limited to engineering. LaFrentz has three young designers and a stenographer. Gustafson has six designers and a stenographer.

Since in most engineering organizations there is heavy clerical work, a third General Office Section was set up. It takes care of all work that is not connected with engineering design, and R. L. Schmidt, assistant to Freeborough, directs it as part of his organization functions.

As a matter of fact, one of the problems is to keep clerical work out of the engineering departments. This is done by farming all non-engineering jobs out to the General Office Section.

Roads Are First Designated

According to Texas law, work can be done only on routes that are "designated" by the Texas Highway Commission. The policy of the Commission is clear-cut. It will not designate a route unless the money to pay for the improvement is a probability. It designates only those roads which justify a 2-lane dust-free type of improvement.

Designation, then, is preceded by extensive work.

First, a county map with traffic counts and all important traffic characteristics is prepared by the Texas Highway Department. This map is sent to all County Commissioners Courts, interested civic groups, and road heads.

At the same time the Highway Department sends out a letter to the local district engineer—there are 25 in Texas—advising him of approximately the amount of money he can expect for land-service roads in his area. In some cases both money and mile allocations are made. In all cases the district engineer is given all available information on what he can expect.

At his convenience, the district engineer then meets with the various Commissioners Courts, and reviews what they recommend. Using his background information, he works closely with these local people, advising them about how much construction they can expect to do with the available funds. This contact calls for tact and, in some cases super-salesmanship. Most commissioners want the roads in their particular districts first, but sometimes the district engineers have to point out that other counties need them more.

The district engineer then prepares a letter to Austin headquarters, in which he transmits the recommendations of the County Commissioners Court. Almost always, his preliminary work with the counties permits him to concur with the recommendations. When he does not concur, the division head reviews both sides of the case and it eventually comes to an agreement, even if it has to go to the State Highway Engineer or the Highway Commission.

On the basis of these letters, the Ad-

(*Concluded on next page*)

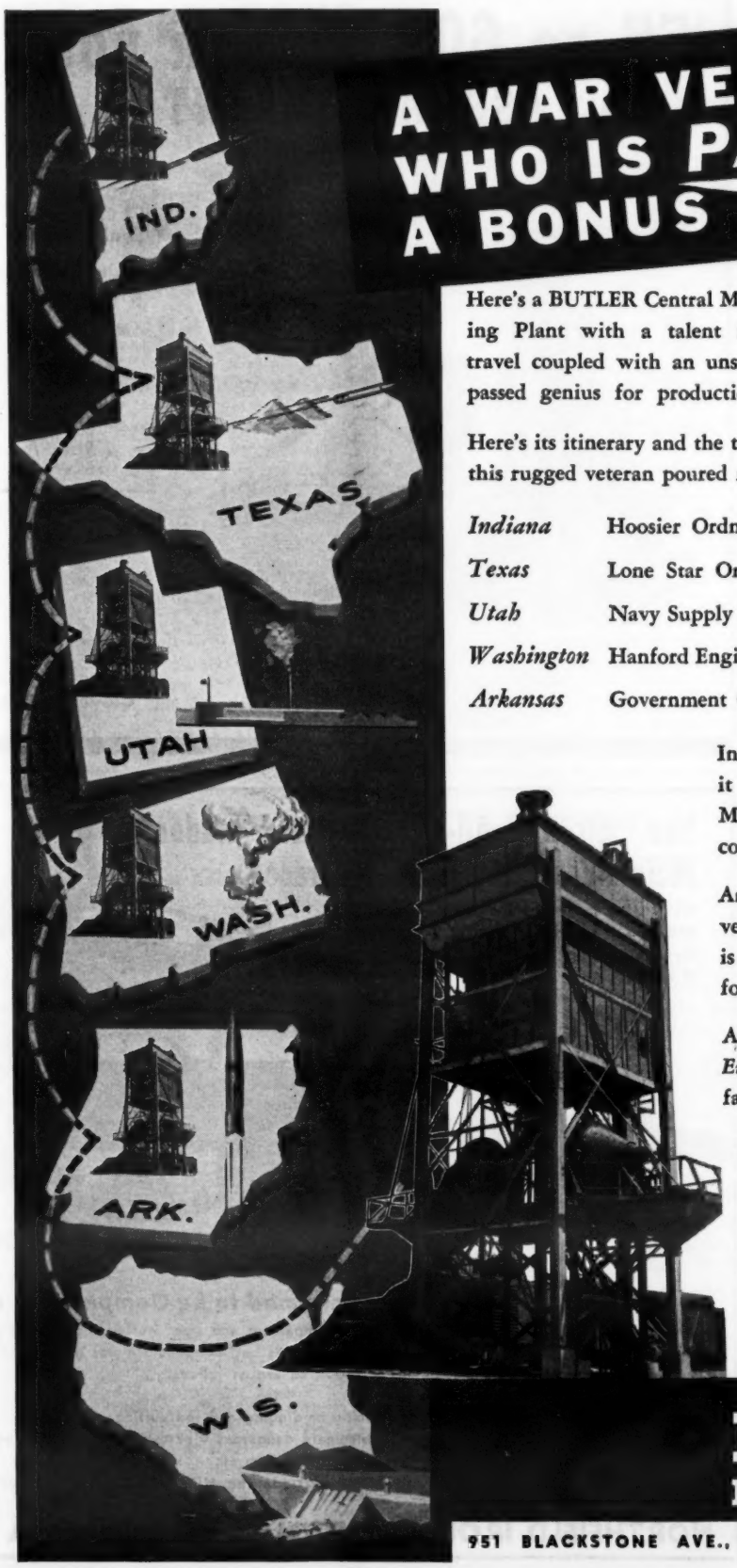
Texas Highway Department Photos

Before and after scenes: a modern farm-to-market improvement near Gonzales, Texas.

Jobs Done Quicker, Cheaper

Attached to Tractors, Bulldozers, Motor Graders and Scrapers, the Automatic Slope-Meters are in use on the construction of highways, airports, dams and building sites. Slope-Meters are compact, sturdily constructed instruments that will automatically show the operator the exact grade or slope on which he is working.

Order from Your Equipment Distributor Today
OR
THE SLOPE-METER CO.
MOUND, MINNESOTA



A WAR VETERAN WHO IS PAYING A BONUS

Engineered BUTLER Design

Here's a BUTLER Central Mixing Plant with a talent for travel coupled with an unsurpassed genius for production.

Here's its itinerary and the top secret war construction for which this rugged veteran poured millions of yards of concrete.

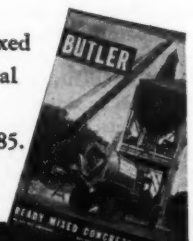
Indiana	Hoosier Ordnance Plant (shells).
Texas	Lone Star Ordnance (shells and powder).
Utah	Navy Supply Base.
Washington	Hanford Engineering Works (the atomic bomb).
Arkansas	Government Ordnance Plant (rocket powder).

Incidentally, on all these war projects it was the Kolinsky Concrete Co. of Milwaukee which was in immediate command of "Operations Concrete."

And now — far from retirement, that veteran BUTLER Central Mixing Plant is *paying* a bonus by pouring concrete for a power dam at Ladysmith, Wis.

All of which proves that BUTLER *Engineered Design* also pays a bonus far beyond expectation.

For complete descriptions of BUTLER Ready Mixed and BUTLER Central Mixing Plants write for Bulletin 185.



BUTLER BIN COMPANY

951 BLACKSTONE AVE., WAUKESHA, WISCONSIN

Land-Service Roads: A Texas Specialty

(*Continued from preceding page*)

ministrative Division then assembles a tentative list of routes programmed for designation. The Commission meets, reviews the list, and designates the sections for improvement which are most meritorious. Under ordinary conditions it takes 100 vehicles a day or more to justify consideration of a local road for designation in the land-service system.

Project Now Designed

Freeborough's engineers now go to work on the design of the designated individual projects. Surveys, soil studies, drainage patterns, and so on are conducted by field personnel in the districts, working in close liaison with the Land Service Roads Division. Data assembled in the field are transmitted to the design engineers.

Generally, the design standards of the AASHO and BPR for secondary construction are followed. Some deviation is sometimes necessary. If traffic is on the upgrade, standards might be exceeded. In a few cases, design is below standard.

All design is governed strictly on the basis of economics. If studies indicate that costs may be nearly equal for various designs, alternates are written into the bids. Requests for bids on a flexible base, for example, might be for caliche, asphalt stabilization, or portland-cement stabilization. Invariably this encourages competition and results in a saving to the Highway Department.

Many frills and fancies are also removed in the design department. When plans leave there, they are sufficiently complete to let a resident engineer build his job. The Land Service Roads Division carries through with plans, design, bids, and so on until the bids are opened and the contract is awarded. Construction then passes to the proper department, headed by Jed Robinson. Working through district and resident engineers, the Construction Department then gets the construction accomplished.

A Field for Experimentation

Land-service construction has proved to be a fertile field for new ideas. Since the 18 to 24-foot roads cost less than $10,000 a mile, resident engineers can often try new ideas, particularly where local road-building materials in the proper proportions are difficult to find.

One autumn day several years ago a job got caught by weather. Its grade was in, but none of the asphalt surfacing had been applied. The weather was too cold to attempt it then. Knowing that the prime coat wouldn't carry the traffic through the winter, the resident engineer was worried.

Freeborough drove out. He and the job engineer talked for an hour. They were no nearer a solution. They took a walk and found a tiny deposit of sand in one corner of a near-by field. Measuring it carefully, they decided there was just enough to try something.

A misty shot of RC-2 was applied and a light coat of the sand went on. The road carried traffic through the worst winter in Texas history, and developed only about 20 small potholes. These were patched the next spring and the contractor put down the specified oil treatment. The job has given excellent service ever since.

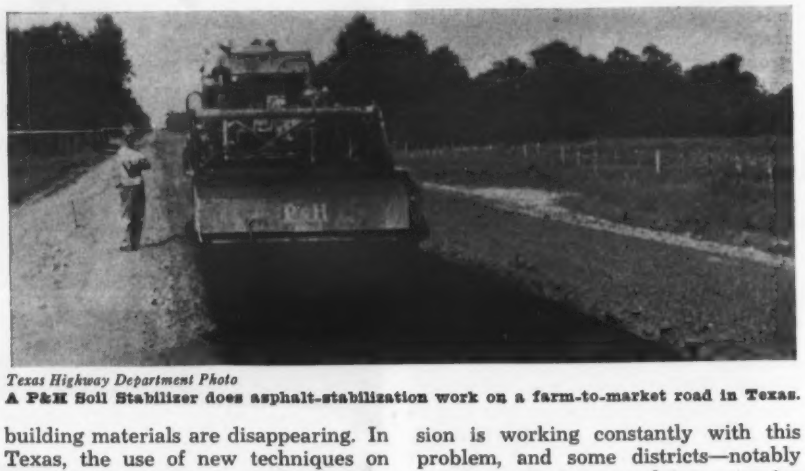
Old bases, Freeborough believes, have an intangible bearing value that has never been accurately measured. He is a firm believer in using old alignment for secondary roads wherever it meets today's standards, to take advantage of the carrying capacity in the old base. He cites the old road between Austin and San Antonio as an example. That road today is carrying about the same traffic volume it was designed for back in 1915.

More and more, sources of good road-building materials are disappearing. In Texas, the use of new techniques on some of the secondary route points the way to success later on when expensive primary construction gets under way. As materials sources disappear, certainly road builders will be forced to develop alternates. Freeborough's division is working constantly with this problem, and some districts—notably No. 14 at Austin—are doing extensive experimental blending of native materials for flexible bases.

Asphalt and cement stabilization has been used successfully in all parts of the state. Extensive work with lime stabilization has been done near Austin . . . not that lime is a new road-building material. Caesar used it to fill the chinks in the Appian Way. It is too costly today, if cheaper bases will do the work.

Enormous though the land-service program has been since the war, a bare beginning has been made. Texans appreciate the job that has been done, so much so that the ever-current question sounds something like, "When are yuh goin' t'git to the rest of the roads we're needin' up in our county?"

That question is repeated frequently in 254 counties which make up the state. It's a big job.



Texas Highway Department Photo

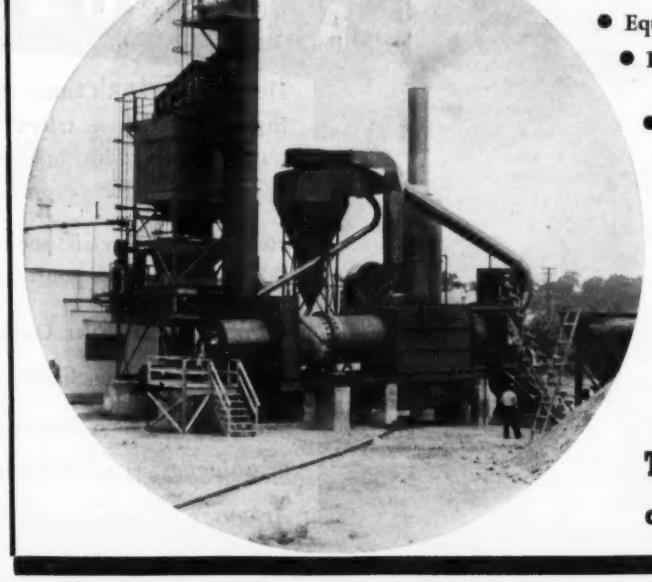
A P&H Soil Stabilizer does asphalt-stabilization work on a farm-to-market road in Texas.

Head of Graver Co. Dies

Edward B. Heyden, 52, head of Graver Construction Co., and Vice President of Graver Tank & Mfg. Co., Inc., died at his home in Cranford, New Jersey, April 18. He had been associated with Graver since 1946.

55 TO 60 TONS PER HOUR ASPHALT PLANT

CUMMER ASPHALT PLANTS



- Equipped with feeder bin and feeder
- Dust collector discharging reclaimed dust into hot elevator
- Complete with storage tanks with hot oil heat
- Combustion by oil and low pressure air
- No steam used on plant

Sizes from 25 to 100 Tons (drying and mixing units) available

PROMPT SHIPMENT OF ALL SIZES

Feeders — Storage Bins — Pumps — Timer

Literature on request

THE F. D. CUMMER & SON COMPANY
Builder of fine asphalt plants
Cleveland 15, Ohio **USA**

The "HUSKY" All-Purpose Road Grader, Maintainer, Ditcher and Terracer

With or without Front End Control and/or Off-set Hitch or with Hydraulic Controls if desired.

THEY COST MORE and Are WORTH IT

HUSKIES are not claimed to be Competitors of Motor Graders.

Both machines have their place. Both are good companions and when worked together, sales volume is increased.
The HUSKY should not be sold where the motor grader is best nor should motor graders be sold where the HUSKY will do the best work.
Some of the applications recommended for HUSKIES are as follows:

(a) Shoulder maintenance.
(b) Rural road maintenance, ditch cleaning or digging and sod cutting.
(c) Pulled by large motor graders to eliminate dangerous windrow and complete dragging job in one round trip.
(d) Farm terracing, ridging, ditching, tile trench filling, etc.

On above applications the HUSKY will do it better and cheaper.

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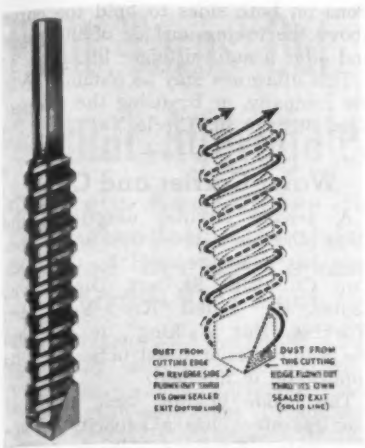
NORTHFIELD IRON COMPANY P.O. Box 30-A Northfield, Minn., U.S.A.


DUST FROM CUTTING EDGE ON REVERSE SIDE FLOWS OUT THRU ITS OWN SEALED EXIT (DOTTED LINE)
DUST FROM THIS CUTTING EDGE FLOWS OUT THRU ITS OWN SEALED EXIT (SOLID LINE)

Notice the double "dust-exit" which is built into the Cyclo-Twist carbide-tipped rotary drill bit.

New Masonry Drill Frees Hole of Dust

A new masonry drill designed to remove dust as it drills has recently been introduced by the New England Carbide Tool Co., Inc., 60 Brookline St., Cambridge 39, Mass. The new Cyclo-Twist has a carbide-tipped drill bit with two spiral low-angle flutes turned into the steel drill body. The diameter of the body is the same as the diameter of the hole to be drilled. The twist feature is said to eliminate hole cleaning and drill stalling or a slowdown. Uniform removal of the dust also provides lower drilling temperature and lengthens the drill life, the company says. These drills are available in sizes from 3/16 to 1 inch inclusive.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 77.

End-Discharge Mixer

A new lightweight 3½-S end-discharge tilting mixer has been developed by the Ransome Construction Equipment Division of Worthington Pump & Machinery Corp., Dunellen, N. J. It weighs less than 800 pounds and can be handled and spotted by one man. Its 48-inch loading height is designed for fast charging and less operator fatigue. It is powered by a Wisconsin Model ABN air-cooled engine.

Mechanical features of the new mixer include an independently sprung wheel to eliminate road shock; an access door on the vertical side of the engine housing so the engine will not get wet if the machine is operated with the door off; a tow pole less than 6 inches from the ground so the machine can be towed over rough terrain without damage to the leg support; and a fingertip-controlled drum lock. Steel or pneumatic-tired wheels are interchangeable on the unit. It has an overall height of 61 inches and a discharge height of 27 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 114.

Drainage Structures

Literature on Armco metal drainage structures has been prepared by Armco Drainage & Metal Products, Inc., Middletown, Ohio. It presents the line of Armco flexible underground structures, Multi-Plate structures, and end-sections. These structures, the folders explain, have a continuous beam strength, resist loads and impacts, and have a high joint efficiency; they are designed to meet the job needs of highway, railway, airport, municipal, and industrial service.

Illustrations in the folder on culvert end-sections show how the bolted coupling band provides a positive connection to corrugated-metal culverts, and how the adjustable cut-off wall can be extended to any depth necessary to prevent undercutting. This end treatment also eliminates obstructions above the shoulder grade and offers funneled flow into the pipe or Armco Pipe-Arch. These sections are available to fit full round pipe in diameters from 8 to 48 inches and Pipe-Arch from 17 x 11 to 72 x 44 inches.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 69.

For Pavement Stability Under Wet Road Conditions

Literature describing Nostrip, an organic chemical additive for tar and asphalt, has been issued by the Nostrip Division, Maguire Industries, Inc., 122 E. 42nd St., New York 17, N. Y. This product is designed to improve the adhesion of bituminous materials to mineral aggregates, especially under adverse moisture conditions, and to reduce the loss of stability of the bituminous mixture due to the detrimental action of water. The literature points out that Nostrip has been used for surface treatment, hot and cold plant-mix, penetration, mixed-in-place, cold patch, and various other types of bituminous pavement construction.

The literature lists the features of Nostrip, offers testimonials, and illustrates its use under adverse weather conditions. One of the folders presents an immersion-compression test chart of treated versus untreated asphalt. The test results indicated that the untreated asphalt retained an average of 44 per cent of its dry compressive strength versus an average of 90 per cent for the treated asphalt. The literature also points out that Nostrip-treated asphalt is available from most major oil companies and refineries throughout the country. It gives directions for blending Nostrip in a stationary tank, distributor, tank transport, or tank car.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 71.

There's Always a **BEST WAY**

That goes for snow clearance, too. It's no mere accident that

DAVENPORT-FRINK SNO-PLOWS

enjoy engineer-preference throughout the snow belt. They have won their spurs through Faster • Safer • Cleaner Snow Removal.

PLAN AHEAD

The best time to think about increased efficiency for next year is NOW. We'll gladly supply complete information.

ALL SIZES and TYPES for TRUCKS ● TRACTORS ● MOTOR PATROLS

DAVENPORT BESLER CORP.

Dept. A. Davenport, Iowa

Made in Eastern U.S.A. by CARL H. FRINK, 1000 Islands, CLAYTON, NEW YORK

12 BIG REASONS why more and more engineers and contractors are specifying

FLEXCELL

REG. U. S. PAT. OFF.

. . . the JOB-PROVED *Bituminous Fibre Expansion Joint*

No other gives you *all* these important advantages and economies!

1. Flexcell Is Non-Extruding. Millions of tiny air cells permit compression without displacement. Will not extrude under pressure by adjacent concrete slabs.

2. Flexcell Is Resilient. Re-expands on release of compression, preventing open joint crevices. Flexcell's "recovery" under severe laboratory tests is over 70%.

3. Flexcell Is Compressible. Compresses uniformly. No hard cross-grain, knots, or other defects. Gives 50% compression under load not to exceed 750 lbs. per square inch.

4. Flexcell Is Durable. Proved by years of actual use in major installations all over the nation. Withstands severest service, extremes of heat and cold. Made proof against termites and fungus by the exclusive patented Ferox Process.

5. Flexcell Adheres Firmly. Its rough-textured surface grips and holds concrete more firmly. Keeps joints closed.

6. Flexcell Stays Put. No possibility of any piece, splinter, or strip working loose and protruding above surface of slab, thus impeding or endangering passing traffic.

7. Flexcell Is Moisture Resistant. Each of the long, tough Louisiana cane fibres in Flexcell is coated with a durable moisture-proofing compound by the exclusive Flexcell Process.

8. Flexcell Has Easy Workability. Lightweight, easily cut with hand saw, readily stored, holds its shape indefinitely. Gives neat, finished joint with no trimming.

9. Flexcell Is Always Uniform. Precise scientific control during manufacture assures uniformity. Every square foot is uniformly dependable.

10. Flexcell Is Versatile. Outstanding for work requiring special cutting, tapering, and fabricating. Unsurpassed for concrete work above grade, around bridges, grade separations, overpasses, and concrete building construction. Replaces products of much greater cost.

11. Flexcell Is Economical. Measured in terms of performance and service, Flexcell is indisputably the most economical product of its type on the market.

12. Flexcell Is Quickly Available. Flexcell distributors conveniently located from coast to coast are kept supplied with ample stocks at all times. These distributors are equipped to handle all requirements, special sizes, cutting, punching—promptly, without delay!

MAJOR INSTALLATIONS LIKE THESE PROVE FLEXCELL PERFORMANCE

Flexcell has been installed in highway and bridge pavements, airport runways, sidewalks, curbs and gutters, driveways, etc., on projects such as: San Francisco-Oakland Bay Bridge, Pennsylvania Turnpike Super Highway, Chicago Municipal Airport, Knickerbocker Village, New York. Flexcell is regularly specified for use in concrete pavements by a large majority of State Highway Departments. The U. S. Army, Navy and other Government agencies are large users of Flexcell for cantonments, munition plants, housing and other projects.

SPECIFICATION APPROVALS

Flexcell meets the requirements of:

American Association of State Highway Officials Standard Specification M 59-42

Federal Specification HH-F-334

American Society for Testing Materials Tentative Revisions of Standard Specifications for Preformed Expansion Joint Filler D 544-48

Write today for complete specifications and prices on Flexcell Bituminous Fibre Expansion Joint

THE CELOTEX CORPORATION
Chicago 3, Illinois

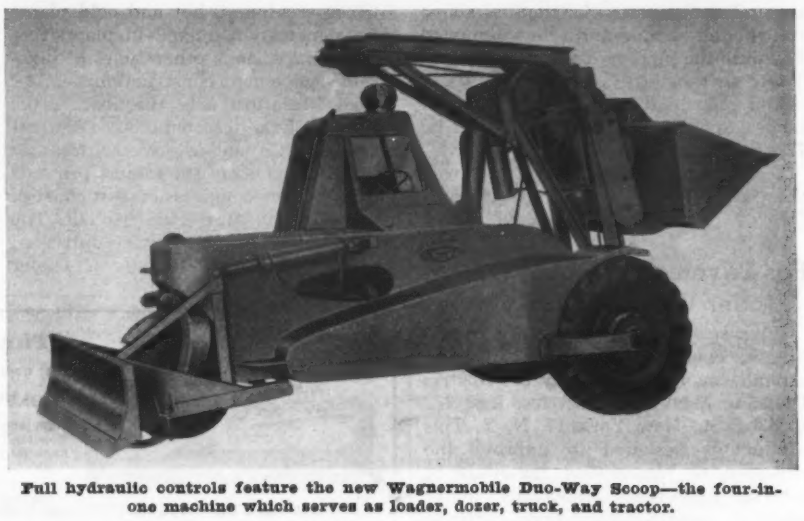
Four-in-One Loader, Dozer, Truck, Tractor

An improved model of the Wagnermobile Duo-Way Scoop, with hydraulically controlled track and dozer blade, is announced by Mixermobile Manufacturers, 8207 N. E. Killingsworth, Portland, Oreg. Full hydraulic controls in the new model permit smooth, fast action in the four operations that the Duo-Way performs, the company says. The unit may be used as a loader, dozer, truck, and tractor.

The Duo-Way has an 84-inch dozer blade at one end and a 1-cubic-yard scoop at the other. Side-saddle seating provides unobstructed visibility for operations at either end. Powered by an industrial 114-hp engine, it has four speeds in either direction.

The new model has a special tilt-control tract which tilts 10 degrees back or forward for easy loading and balance. The top section of the tract folds down to 9½ feet for low road clearance. This model of the Duo-Way will have planetary drive for complete power output. Weight with dozer attachments is 10,950 pounds; wheelbase, 126 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 84.



Full hydraulic controls feature the new Wagnermobile Duo-Way Scoop—the four-in-one machine which serves as loader, dozer, truck, and tractor.

New Fire Retardants

A new fire retardant has recently been developed by the Flamort Chemical Co., 746 Natoma St., San Francisco 3, Calif. The patented dry compound is mixed with water and sprayed on unpainted wood, fabrics, or other combustibles. The heat of a fire liberates nonirritating nontoxic gases which dilute and cool the products of combustion to below their spontaneous ignition point, the company says. At the same time a glaze and char-like coating forms at the area touched by the flame. Thus the material which has been impregnated repels flame and has no tendency to smoulder, the manufacturer reports.

In the case of exterior spray treatment, surfaces may leach out in time if continuously exposed to the weather. The company points out, however, that an exterior paint over the sprayed surface will protect the treatment. Surfaces already painted should not be treated. After the solution has dried, the color of the original wood returns.

The dry compounds are packed in fiber drums and wooden kegs designed to save storage space and transportation cost. Flamort WC, designed for construction work, has been tested and listed by Underwriters' Laboratories for use on lumber and cellulose board. A one-gallon solution is said to put three coats on 110 square feet of lumber. The tank-immersion treatment requires 35 pounds and up of the dry compound for 1,000 board-feet of lumber, Flamort says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 11.

Drafting Instruments

A new 30-page catalog illustrating and describing materials and equipment for engineers, architects, surveyors, and draftsmen is available from Berger Scientific Supplies, Inc., 342 Madison Ave., New York 17, N. Y. The line includes drawing sets, drop bows, interchangeable bows, beam compasses, dotting instruments, dividers, planimeters, proportional dividers, ruling pens, drawing boards, french curves, pantographs, protractors, scales, slide rules, T-squares, and triangles.

The transparent drafting aids are made of Lucite and Polystyreme and are lightly colored in an eye-rest green to retain complete transparency yet refract room light and paper glare. The french curves have button-like extrusions on both sides to hold the curve above the inking surface of the paper and offer a natural finger lift.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 127.

Water Carrier and Cups

A 4-page circular describing the Dixie portable water carrier and Vortex cups has been prepared by the Dixie Cup Co., 24th St. and Dixie Ave., Easton, Pa. Titled "Keep Your Men Working, Not Walking", it describes the water-carrier construction and its application in the field.

The inside holding tank, made of stainless steel, has a capacity of approximately 4 gallons. The unit is 8 x 15 x 18 inches and weighs 44 pounds when full. The recessed faucet and other special features are highlighted in the folder.

This literature may be secured from the company, or by using the Request Card at page 16. Circle No. 90.

USE THE HANDY

YORK RAKE

WITH YOUR PRESENT MOTIVE EQUIPMENT!

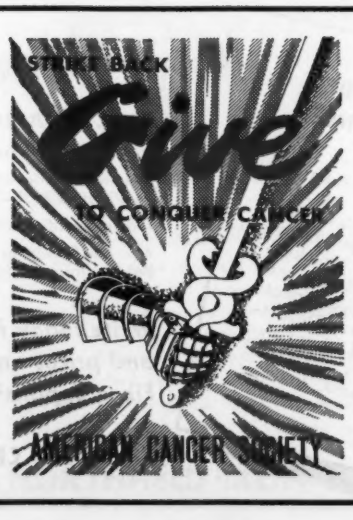
● Here's why the York Rake Attachment is popular with road maintenance men and contractors . . . It does a top-notch job of road finishing without benefit of any special motive equipment. Weighing only about half a ton, it is easily handled by your present trucks, tractors or graders . . . yes, even by a Jeep!

● The RAKE is ideal for finishing the surface of secondary roads. It redistributes the windrow left by the grader, screens out the oversize stones, carries them to the side of the road. Usable material remains to form good road surface. If drawn by a power grader, it does the job without an extra trip.

● It works equally well on level ground or slopes, and is applicable to a variety of contractor's requirements.

● *Write today for complete details.*

YORK MODERN CORPORATION
UNADILLA, N.Y.



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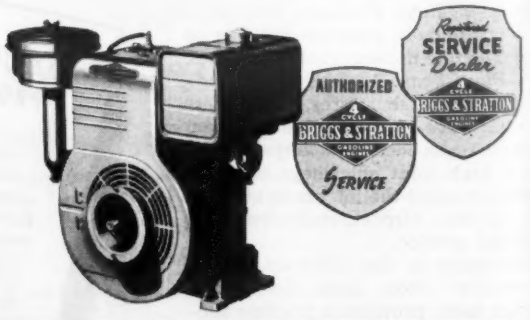
World-wide SERVICE

Through the Largest Network of its Kind in the World

There is a Briggs & Stratton service organization, factory-trained and supervised, near you — with a complete stock of genuine Briggs & Stratton parts for all models.

Briggs & Stratton service is world-wide — and constitutes the largest network of its kind. It is an important part of Briggs & Stratton's continuous effort to make its engines of greatest constant value to their users.

BRIGGS & STRATTON CORP., Milwaukee 1, Wisconsin, U.S.A.



In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

Plant Turns Out Canal Aggregates

Concrete Aggregates for Delta-Mendota Canal Job Produced by High-Capacity Portable Rock Plant

✦ CRAWLING ever southward toward its destiny with California's Central Valley, the great Delta-Mendota Canal has now reached a point of completion near Newman. Here, 60 miles from the Tracy Pumping Plant (See C. & E. M., May, 1950, pg. 42), Western Contracting Corp. of Sioux City, Iowa, has nearly $9,000,000 worth of construction under way for the U. S. Bureau of Reclamation, builder of the Central Valley Project.

Pieces of the canal have also been finished below Western Contracting Corp.'s location, and soon the gaps will be closed. The big 4,600-cfs canal, which will carry irrigation water from the Tracy Pumping Plant southward to irrigable acres in the San Joaquin Valley, is being finished at an amazing rate of speed. Eating through flatlands and low hills which ring the valley along its western edge, earth-moving and concrete machines are moving forward at speeds which, for the concrete-lining machines at least, approximate a mile per week.

The huge slice of construction work which the Iowa contractor now has under way includes two separate contracts, one 15 miles long and the other 17 miles long. Officially the two contracts differ in Bureau records. One is being done, according to Government contract records, by H. H. Everist, Sr. Both firms are a part of the large construction firm headed by Hubert H. Everist, Sr.

Aggregate Production Big Job

One of the most interesting parts of the extensive job is the production of aggregates which enter into the concrete work in lining and structures. A high-production 250-ton-an-hour portable plant, which is the equal of many a permanent set-up of that type, is the principal feature. Fortunately, a semi-angular alluvial fan containing natural sand and boulders suitable for concrete aggregates was found by Bureau of Reclamation technicians near Newman, midway in the 32-mile job. One plant set-up will produce all the required rock.

Imagine 32 miles of concrete highway 4 inches thick and 101 feet wide, with over 150 structures such as bridges, wasteways, checks, turnouts, and drainage drops, and you have a picture of the amount of aggregate required.

Natural rock in the alluvial deposit consists of sand and boulders up to about 9 inches in size. The native material is so well graded, however, that the only waste material consists of about 5 per cent, which leaves the plant in the form of boulders larger than 4 inches, decantable material such as silt, and some pea gravel which is left over from the sizing screens. Less than 15 per cent of the native material requires crushing. The rest, with the exception of the small amount of waste material already noted, falls naturally into the proper sizes to make good concrete.

Sand and three sizes of rock are produced by the aggregate plant, which is set up with plenty of room and access around all its components. The batching plant and cement-storage silos are also located at this point, thus mak-

(*Continued on next page*)

C. & E. M. Photo
A Bucyrus-Erie 51-B dragline loads raw pit gravel to a Koehring Dumptor which will take the material to Western's concrete plant.

GRIFFIN
WELLPOINT SYSTEMS
JETTING PUMPS
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GRIFFIN WELLPOINT CORP.
881 E. 141st ST., NEW YORK 54, N.Y.
TEL. ME. 5-7704

NEW International 6-wheel Trucks

give you balanced Heavy-Duty Engineering

America's most popular heavy-duty trucks now come to you in new 6-wheel models, ranging in GVW from 22,000 to 45,000 pounds.

The International models in this complete new line are all outstanding products of balanced heavy-duty engineering. This means that every model is carefully balanced for lower operating costs, for longer truck life, for better all-round operation.

You get the proved heavy-duty engineered value that has kept International first in heavy-duty truck sales for 18 straight years. You get traditional stamina plus new operating economy, new comfort, new ease of handling.

You can see proof of heavy-duty engineered stamina in the new frame, new bogie, and new spring-and-saddle assembly. You can see proof of operating economy in the combustion chamber design of the new Super Blue Diamond and Super Red Diamond power plants. You can see proof of super-comfort and super-visibility in the new Comfo-Vision Cab—"roomiest cab on the road"... proof of steering ease in new Super-steering.

And that's not all. You can see proof of the advanced nature of this new balanced engineering throughout every 6-wheel model. One typical example is the new third differential. This new differential takes the place of the power divider, eliminates need for an extra propeller shaft, and makes practical shorter 6-wheel units.

Get the complete story about these new 6-wheel versions of America's most popular heavy-duty trucks. Find out why they mean more money in YOUR pocket. See your nearest International Truck Dealer or Branch.

International Harvester Builds
McCormick Farm Equipment and Farmall Tractors
Motor Trucks . . . Industrial Power
Refrigerators and Freezers

Tune in James Melton and "Harvest of Stars"
NBC, Sunday afternoons

ALL NEW, ALL PROVED
INTERNATIONAL TRUCKS
INTERNATIONAL HARVESTER COMPANY CHICAGO

Plant Turns Out Canal Aggregates

(*Continued from preceding page*)

ing a compact concrete-producing package.

Plant Easy to Move

When the plant was built, Western's officials stressed the need for a high-capacity unit which could be torn down and moved in a short time. These officials gave their ideas to C. W. Jones of Los Angeles, a consulting mechanical engineer, who drew the plans for a plant which would embody all their thoughts.

All plant erection is done with pins, and everything can be moved in a few shifts' time. The entire conveyor system, built by Conveyor Co. of Los Angeles, comes in standard 30-foot sections. Pins connect these sections.

The plant is equipped with individual electric motors for each of the conveyors, crushers, and other parts. New motors are being added from time to time to replace internal-combustion engines formerly used, and to replace worn electric motors. The plant has a slowdown switch, controlled by the operator high up on the plant, which permits a variable rate of feed from the receiving hopper.

Another unusual feature is the use of wash water where there is hardly any water around. This water comes from a well about 2,000 feet from the aggregate plant. It is pumped by a motor-driven centrifugal pump with a rated capacity of 1,000 gpm.

Aggregate Route

In its route through the plant, the aggregate in native form is first dug from the pit by a new Bucyrus-Erie 51-B dragline, equipped with a 3-yard Hendrix lightweight bucket and a 65-foot boom. While the use of a 3-yard bucket, is theoretically overloading the 51-B by 33 per cent, the machine is standing the gaff in good shape with a minimum of maintenance necessary.

The 51-B loads the pit-run material to four Koehring Dumptors. Each Dumptor will take two buckets of material, which makes a heaping load. The loads are hauled about 750 feet one way to the primary receiving hopper, which makes up the first unit of the aggregate plant. The hopper is accessible by means of an earth feeder ramp.

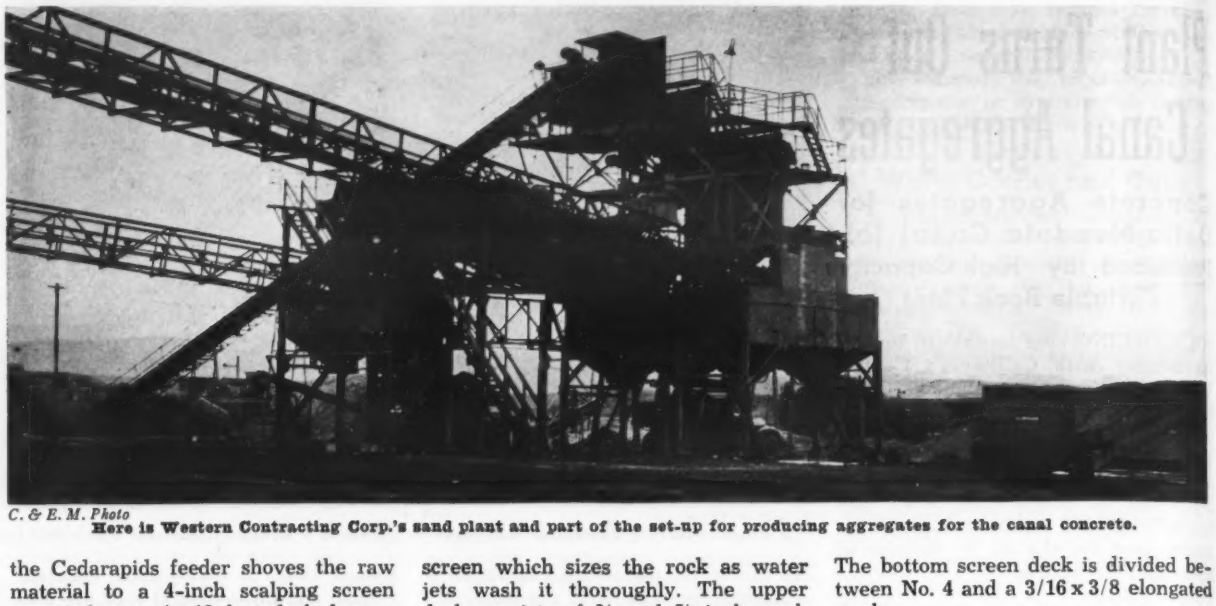
Driven by a 15-hp electric motor, the Cedarapids feeder shoves the raw material to a 4-inch scalping screen mounted on a 4 x 12-foot deck framework. This scalping screen is vibrated by electric power. Plus-4-inch material, retained on the screen, passes immediately to a waste pile. The percentage of material which reaches this pile, however, is small.

All throughs pass to a 36-inch conveyor about 30 feet long, which carries the rock up to a scalping deck fitted with 1¾-inch screen. Material which passes this screen drops down to a conveyor deck and passes direct to the washing plant.

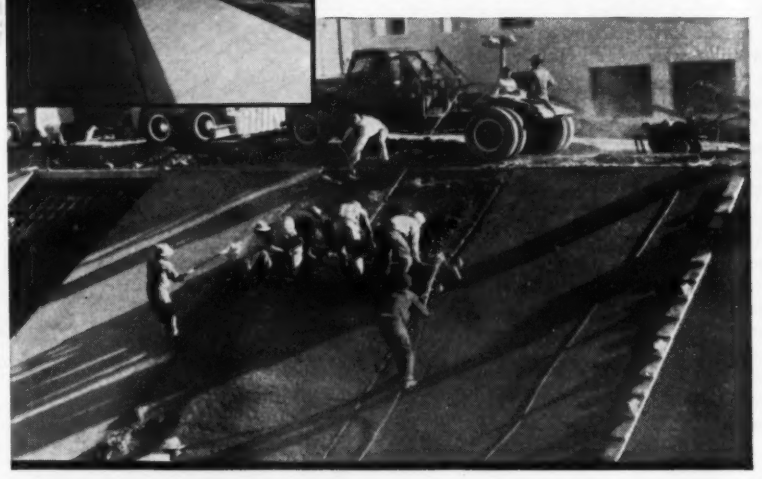
Oversize rock which is retained on this scalping deck passes through a 10 x 30 Cedarapids jaw crusher driven by a Caterpillar diesel engine. A 36-inch conveyor from this crusher takes the broken rock to a 40 x 24 Cedarapids roll crusher driven by a new 150-hp electric motor. The roll crusher is hooked with the jaw, conveyors, and top screen in a closed circuit. This returns the rock to the upper screen deck until such time as the crushers have reduced the material sufficiently to pass on through to the washing plant. A 1⅝-inch screen, inserted in this circuit, makes the final sizing. A 30-inch conveyor 150 feet long, driven by a 30-hp electric motor, carries the material on to the washing plant.

The washing plant and sand classifiers are also made to Western Contracting Corp. specifications. The material passes through a double-deck screen which sizes the rock as water jets wash it thoroughly. The upper deck consists of ¾ and ⅞-inch mesh divided equally on the 4 x 12-foot deck. The bottom screen deck is divided between No. 4 and a 3/16 x 3/8 elongated mesh.

(*Concluded on next page*)



C. & E. M. Photo
Here is Western Contracting Corp.'s sand plant and part of the set-up for producing aggregates for the canal concrete.



Templeton Gap Spillway, Colorado Springs, Colo. Angle 45°, Concrete slump ¾". Extra men on screed for weight only.

JACKSON ELECTRIC VIBRATORY SCREED

MOST VERSATILE CONCRETE SCREED AVAILABLE

GREATEST PRODUCER OF QUALITY WORK ON:

SPILLWAYS
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MUNICIPAL PAVING
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HIGHWAY PATCHING and WIDENING
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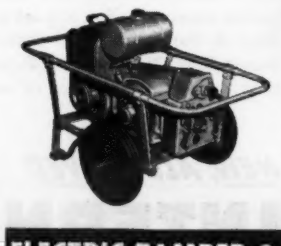
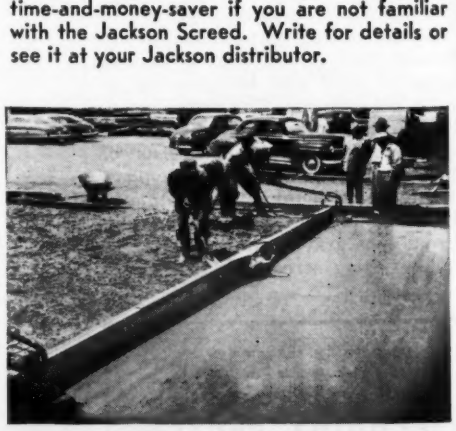
AND MANY OTHER USES

Powered by a thoroughly reliable Jackson 1.25 KVA Portable Power Plant, this manually guided screed will place perfectly upwards of 65 cu. yds. of stiff mix concrete per hour; will undercut at side forms and curbs; strike off to crown (regular or inverted); work right up to and around sewers, manholes and other obstructions. Has strong tendency to propel itself and operators can easily and quickly roll it back for second passes ***without bearing the weight of the screed.*** Operators work from front, rear or side of machine. Quickly adaptable to any slab width from 6' up to any practical width. You're missing a tremendous time-and-money-saver if you are not familiar with the Jackson Screed. Write for details or see it at your Jackson distributor.

Model M-1 Power Plant — operates the screed. Generates both single and 3-phase 60 cycle, 115 volt AC. Equipped with generator requiring no maintenance or adjustment. May also be used for lights or operating tools. Other plants of 2.5 and 5 KVA capacities.





OTHER MONEY-MAKING VIBRATORY EQUIPMENT for all types of concrete construction from thin sections to mass construction, highway and airport paving. FOR SALE OR RENT at your Jackson Distributor. Write for handy Jackson "Pocket Guide" to the complete line.

ELECTRIC TAMPER & EQUIPMENT CO. Ludington, Mich.

The ROGERS 4-FEATURE POWER-LIFT DEMOUNTABLE GOOSENECK

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← RAISES ITS DECK TO CLEAR HIGH BANKED CROSSINGS

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It embodies the kind of versatility that makes every haul *easier, faster, more profitable.*

Loading, at a *lower* angle, is *faster. Larger* tires carry *heavier* loads legally. Unloading, reloading, detouring are *avoided* through quick adjustment of the deck height to *different conditions* encountered.

It's equally as rugged as the standard Rogers Gooseneck regardless of its detachable feature. And it's available on most Rogers Trailers and adaptable to many trailers of other makes.

Bring your equipment up-to-date and be in a position to handle operations more efficiently and more profitably.

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ROGERS TRAILERS

EXPERIENCE builds 'em — PERFORMANCE sells 'em

ROGERS BROTHERS CORPORATION, 108 Orchard St., ALBION, PA.

After washing, all material retained on these decks comes back to a ⅞-inch screen, drops back to a 3/16 x 3/8 elongated screen, and passes through a 7/16-inch screen. Throughs from the fine screen pass directly to the sand classifier and the stockpile. Retained rock from the 7/16 and 7/8-inch screens also goes to the stockpile. Throughs from the 7/16-inch screen are known as pea gravel and go to a waste pile. The company sells a great deal of this fine gravel to near-by farmers, who use it for road surfacing and so on.

Sand is stored in twin piles, each of which holds approximately 6,000 tons. An Armco Multi-Plate tunnel, 8 feet in diameter, passes for a distance of 160 feet under the storage piles. Three feeder gates under each pile, controlled by motors, feed sand to a 24-inch conveyor, which carries it at 250 fpm to the storage hoppers of the Johnson batching plant near by. Sand is used from alternate piles each day, allowing at least 24 hours of storage for the moisture content to equalize. This is a distinct aid in the field control of batch yields and water-cement ratio.

The rock is all lumped together, with the three sizes in one stockpile. A second Multi-Plate feeder tunnel takes the rock, as needed, through open feeder gates. Recent Bureau of Reclamation jobs stipulate that final screening must be done just before the aggregates enter the concrete batches. This is a control measure aimed at eliminating the effects of any action such as grinding or abrasion which reduces the size of aggregate in stockpiles.

After the aggregate is sized by screens to meet the various Bureau of Reclamation mix designs, it is stored temporarily in the hoppers of the batch plant, where it is later weighed out into batches and dumped to a fleet of trucks. At one time over 60 batch trucks, hauling two batches per load, were necessary to feed the fast-moving concrete-lining crew.

Despite any speed made out on the lining machine, however, the aggregate plant turns out enough aggregate in 10 hours each day to keep the operation well supplied.

Personnel

Western Contracting Corp. is doing the job for the Sacramento regional office of the U. S. Bureau of Reclamation. L. N. McClellan is Chief Engineer of the Bureau, and Richard L. Boke is Regional Director. The Bureau's Construction Engineer locally in charge is Oscar G. Boden.

Field work for the contractor is under the direction of Project Manager L. G. Everist, and Equipment Manager Hubert Everist, Jr. Carl "Rip" Collins is General Superintendent. C. F. Hynes is Superintendent of the aggregate plant, assisted by Don Ralph, Aggregate Engineer.

When the present section of canal is finished about January, 1951, it will have a bottom width of 48 feet. It will be approximately 17.5 feet deep. The concrete lining, 4 inches thick, will prevent the seepage of water through the ground. The 4,600 second-feet which the canal will carry will go a long way toward augmenting underground water supplies now used for irrigation in California's rich San Joaquin Valley. Eventually the water will reach a point just a few miles from Bakersfield, only 110 miles north of Los Angeles.

Pennsylvania Buys Dixie

The Pennsylvania Crusher Co., Philadelphia, a division of the Bath Iron Works Corp., has purchased all the capital stock of The Dixie Machinery Mfg. Co., St. Louis manufacturer of crushing and pulverizing equipment. Dixie, however, will retain its identity; and Elmer W. Noxon, former President, is now the company's Acting Manager.

All-Steel Portable Elevator

A 4-page folder describing a builder's elevator has been prepared by The Sam Mulkey Co., 1621 Locust St., Kansas City, Mo. Fully illustrated, the literature shows the Mulkey portable elevator used for conveying bricks, blocks, mortar in buckets or containers, dirt, sacks, and other building materials. The basic unit is 24 feet long and has a maximum lift of 17½ feet. One or two 8-foot extensions may be used to increase its height to 22 or 28 feet.

The catalog features the all-steel electrically welded construction of the lift. The flights are spaced 39 inches apart for handling packaged or loose materials. Other features highlighted in the folder are the choice of 4-hp gasoline engine or 1½-hp electric motor, the trailer hitch for mobility, the detachable motor mounting plate, and the overall light weight.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 50.

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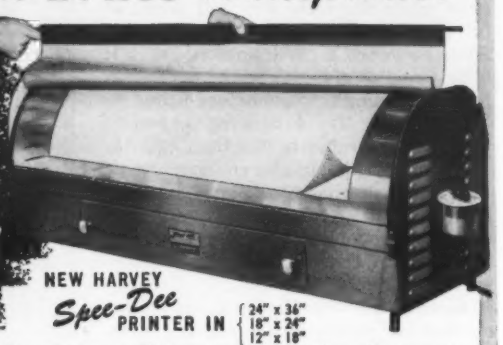

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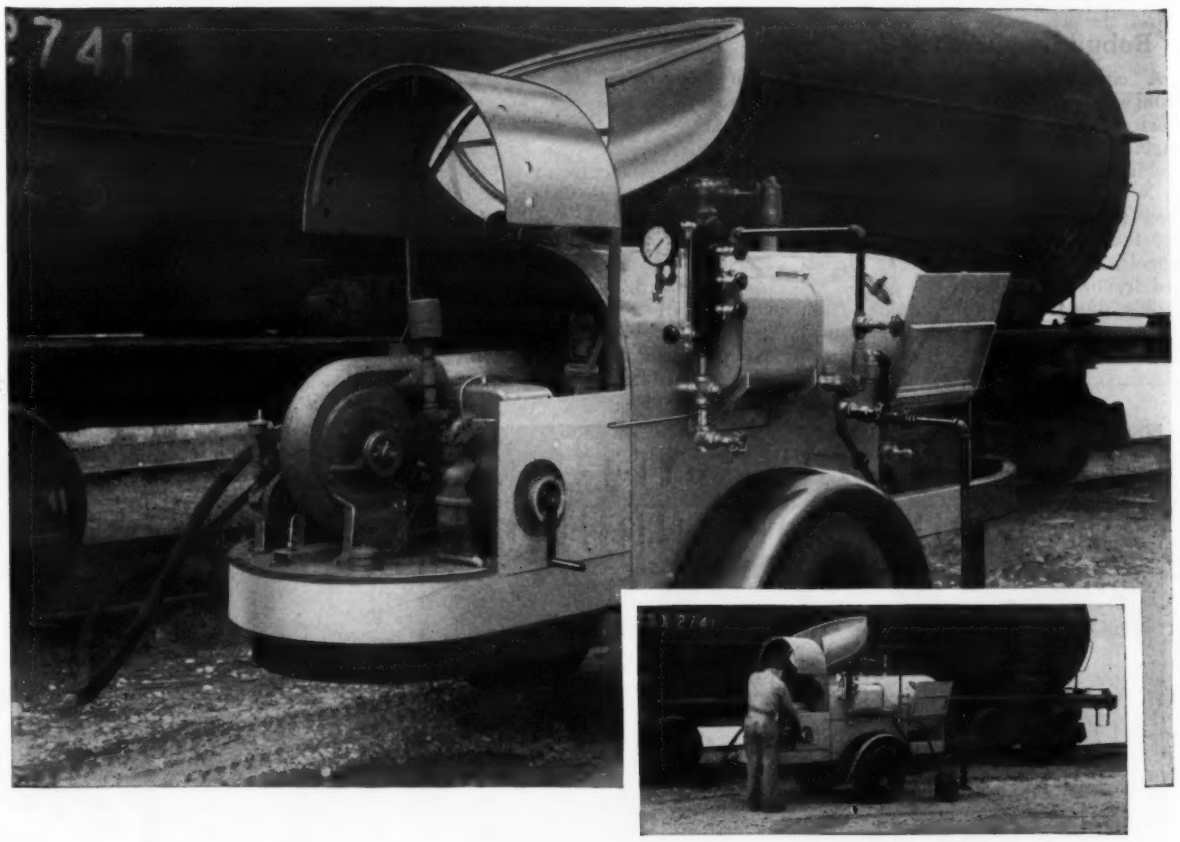

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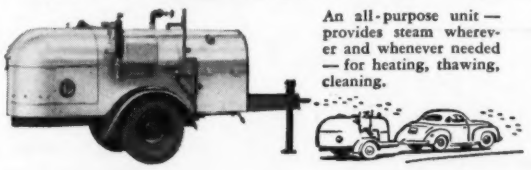
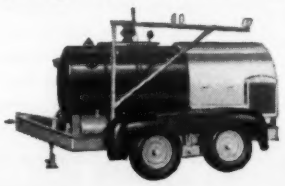
Trailer or Truck Mounted for Quick Job-to-Job Transport

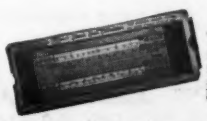


An all-purpose unit — provides steam wherever and whenever needed — for heating, thawing, cleaning.

Working Mate to the Tank-Car Heater — The Pumping Booster



Heat only what you need — not necessary to heat contents of tank car — with a Cleaver-Brooks Pumping Booster. No steam or water required for operation with this oil-fired, high efficiency unit. Available in 2 sizes, skid or trailer mounted.



Write on your business letterhead for the Bituminous-Mix Calculator — a ready reference slide rule showing weight of mix needed in lbs. and tons based on area and depth of area to be covered.

... Use Less Fuel—Water—Work With a CLEAVER-BROOKS Mobile Tank-Car Heater

Designed for fast steaming, the Cleaver-Brooks gives you 125 lbs. steam pressure in 20 minutes — the only tank-car heater with the fuel-saving four-pass flue travel construction. No water problem — full condensate recovery and return to heater under pressure.

Built for full capacity—full time work—available in three sizes, skid or trailer mounted 1 car heater (17 bhp) — 2 car heater (28 bhp), 3 car heater (42 bhp). Write for the Cleaver-Brooks Tank-Car Heater Catalog.

CLEAVER-BROOKS COMPANY
390 E. Keefe Avenue, Milwaukee 12, Wisconsin

Cleaver-Brooks
BUILDERS OF EQUIPMENT FOR THE GENERATION AND UTILIZATION OF HEAT

New Blasting Meter

An adjustable blasting galvanometer, for accurate resistance readings in ohms even when the activating cell is not at full strength, is now available from the Atlas Powder Co., Wilmington, Del. It is designed to give safety and control in testing blasting circuits before firing.

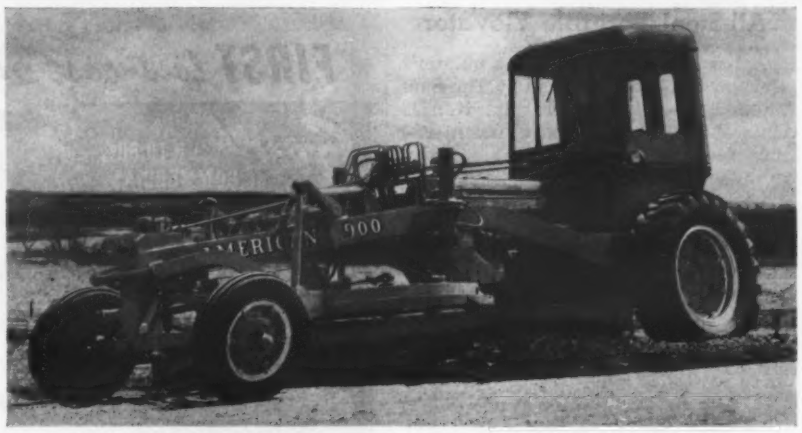
The Atlas No. 4 blasting galvanometer is calibrated to less than ½-ohm resistance. This enables checking small resistances such as a single blasting cap. It may also be used as an ammeter for detection of stray currents, affording an extra measure of protection before hooking up the circuit. The instrument has three terminal posts marked for connections in making three types of readings. As the silver-chloride cell within the galvanometer weakens, adjustment to accurate readings can be made simply by short-circuiting two terminals and turning a screw in the back until full needle deflection is noted.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 85.

Rebuilding Tractor Parts

A circular describing the use of Manganal applicator bars and welding electrodes for rebuilding worn tractor parts has been prepared by Stulz-Sickles Co., 134 Lafayette St., Newark 5, N. J. The folder points out how these products can be used for increasing the life of drive sprockets, idler wheels, track rollers, bulldozer blades, and tractor grousers.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 87.



American Road Equipment Co. parents this new 12,000-pound motor grader.

A New Motor Grader

A new 12,000-pound Model 900 motor grader powered by a 50-hp Minneapolis-Moline gasoline engine has been brought out by American Road Equipment Co. of Omaha, Nebr. The 12-foot blade designed for greater angularity and pitch cuts 3-foot ditches with proper slicing action, says the manufacturer. A 16-foot 4-inch wheelbase and a large hydraulically controlled circle give rigid support and hold the blade to a smooth steady cut that eliminates "washboarding", the company says.

All operations are hydraulically controlled by self-centering control levers in the cab. The following optional equipment may be installed on the American 900: 9-tooth replaceable-tip scarifier; ½ or 1-cubic-yard low-lift material-handling buckets; bulldozer with a 78-inch-wide moldboard 30 inches high; V-type snow plow with a 9-foot 6-inch swath; 10-foot reversible snow plow; a high-lift loader with a ½-cubic-yard bucket and 48-inch cutting edge; and 1-cubic-yard snow bucket with 78-inch cutting edge.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 82.

Helps Teach Your Men How to Avoid Bad Falls

One out of every four accidental deaths is caused by a fall. If you're alerting your workers against this most serious of all industrial accident hazards, you will be interested in a new Safetygraph prepared by the National Safety Council, which shows the dangers of ladders, scaffolds, makeshift equipment, slippery or cluttered floors, stairways, unprotected openings, and horseplay.

There are 12 spirally bound pages, 18 x 24 inches, of colorful cartoons and duo-tone photographs in this visual training aid. On the back of each page is printed a safety talk for the instructor. The pages are inserted in a leatherette portfolio: when it is set on a flat surface, it opens to form an easel.

For information on this Safetygraph or on the 15 others put out by the Council, get in touch with National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

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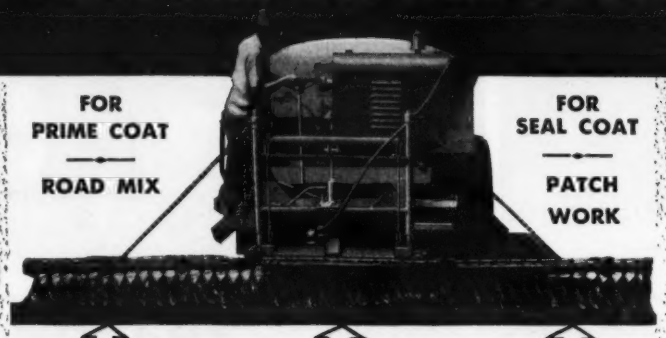

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Need STEEL SHEET Piling?

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Sewage-Plant Pours Are Job Eye-Catcher

Unusual Swivel Joint and Carriage Allow Pumpcrete to Work Continuously; No Pipe Added or Removed

By RAYMOND P. DAY,
Western Editor

♦ A UNIQUE approach to the placement of concrete in a modern sewage-disposal plant is an eye-catching feature of the disposal system now under construction for the City of Ames, Iowa. By using the Pumpcrete method of placement, along with a traveling pipe carriage and swivel joint, Lippert Bros., Inc., of Boone, Iowa, and Oklahoma City is making some good pours.

Half sections of big 135-foot-diameter filter tanks are being formed with Atlas patented steel shapes, and then filled with concrete at a steady rate of 15 cubic yards per hour. Even the concrete-mixing plant is set up to the best possible advantage. The mix is being pumped distances as long as 750 feet through the 6-inch Pumpcrete line.

The new plant, which has the capacity to serve a population of approximately 60,000 people, is being constructed south of Ames, about ¼ mile west of the Skunk River. It is a joint venture between the City of Ames and Iowa State College, with the latter paying 30 per cent of the total $950,000 cost. When the new plant is finished in January, 1951, the existing outmoded sewage-disposal plant for the city will be abandoned, and the new installation can then start to work.

Plant Has Many Structures

Designed by the Cedar Rapids engineering firm of Howard R. Green Co., the disposal plant is modern in every respect. With the aid of research at Iowa State College, many refinements are present in this set-up. For example, the use of Type II cement is expected to reduce chemical deterioration of concrete through action of sewage. The various structures are so arranged that any or all the units can be by-passed from any point beyond the pumping plant.

The structures include three large reinforced-concrete filters, 135 feet in diameter with 10-foot walls 10 inches thick. An inspection and collection gallery around practically all of these tanks results in a double wall around most of the filter perimeter.

Three final clarifiers in the system are 41 feet in diameter, 12 feet high, and have 10-inch side walls. The two digestion tanks are 50-foot-diameter structures, with 26-foot side walls 12 inches thick. The outsides of the digesters are being faced with red brick as an insulating and decorative measure.

The primary clarifier and aerator is an interconnected rectangular structure 83 feet square, with 8-inch walls 9 feet high. There will be 4 clarifiers and 2 aerator tanks in this unit.

The control building and pump house posed a serious job problem, because the deepest part of the building went down 45 feet below the natural ground level into a stratum of sand and ground water. Steel sheet piling was necessary there, with wellpoints and a suction pump. The control building consists of two main floors and an engine control room, making the entire structure 86 feet long and 37 feet wide.

Manholes, piping, machinery, a 120 x 260-foot sludge bed with 13 stalls, along with an 18 x 35-foot comminutor and Parshall flume structure 17 feet high, complete the picture.

Excavation Not Difficult

Structure excavation, with the exception of the deep hole for the pump building, was not too difficult. Two 1-yard draglines, a pair of bulldozers, and about 10 dump trucks mucked out the material fast enough to make room for the building gang. Much of the material for backfill was pushed out to the side by bulldozers. Some of the material was used for the construction of about ¼ mile of road from U. S. 69

(*Continued on next page*)

C. & E. M. Photo

A Quick-Way ¾-yard truck crane with a dragline bucket loads out structural excavation at the Ames, Iowa, sewage-plant site. The material will be used for backfill. Lippert Bros., Inc., of Boone, Iowa, and Oklahoma City, is the contractor on the job.

HENRY DOELGER PICKS LPC MOTOR SCRAPERS

for 12 million [illegible]!

MOVING 12 million yards of sand is a man-sized job in anyone's language. Henry Doelger of San Francisco tackled it to make room for a 7000 new home housing project at Westlake, south of San Francisco. Six LaPlant-Choate Motor Scrapers are moving 11,700 yards per 8-hour day, working on a 1600-ft. cycle. Each load averages 14.3 pay yards. Material is damp sand, weighing 3000 lbs. to the yard. Average loading time is 1-minute. All ejection and spreading is done in high gear. Each unit hauls 17 loads in a 50-min. hr.

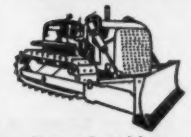
Whether you're moving sand, mud or good scraper dirt, you'll be money ahead if you use profit-making LPC Motor Scrapers. Get the story *first* hand — talk to the men who own them or run them. There are reasons why more and more smart contractors are using the Motor Scraper.

Available now in 2 sizes. The "300" in the 14-17.5 yard class. The "200" in the 9-12 yard class. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; LaPlant-Choate Sales & Service, 1022 77th Ave., Oakland, Calif.

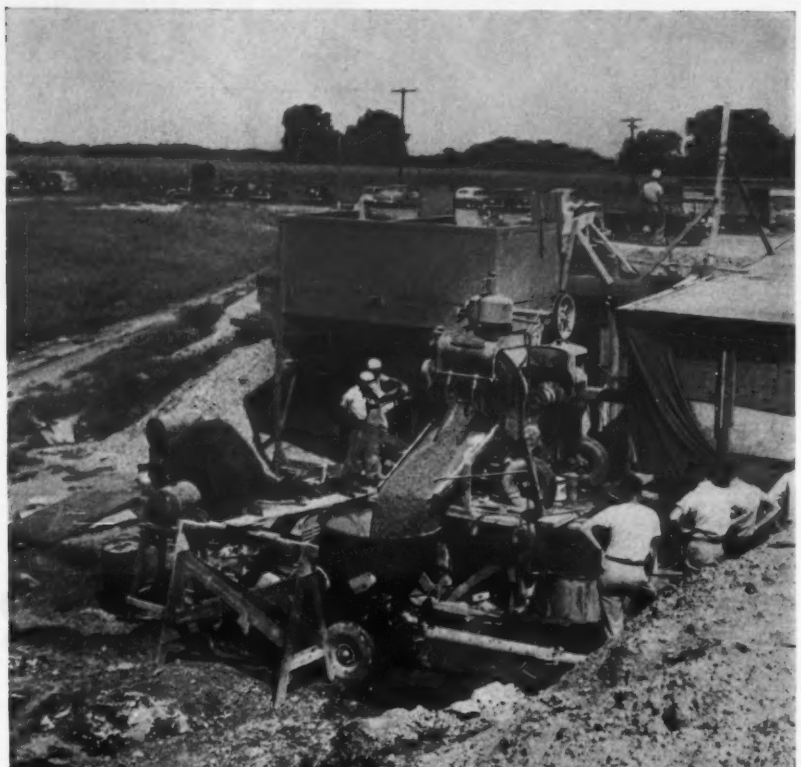
LAPLANT CHOATE

Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type tractors.

2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.



Hydraulic and Cable-operated Dozers.



C. & E. M. Photo
Concrete for the new sewage-disposal plant at Ames, Iowa, is discharged from a CMC mixer to the hopper of a Rex Pumpcrete which will send it to the placing point.

Sewage-Plant Pours Are Job Eye-Catcher

(*Continued from preceding page*)

into the plant site.

The material consisted generally of loam and clay, with some sand and gravel. Several shallow strata of the latter material were encountered on the way to grade, but fortunately all bearing ground for the structures consisted of hard, stiff clay, with a high bearing value.

Ground water was encountered when the filters and aerators were excavated, but wise job planning paid off. The effluent pipe line, which will carry water away from the plant, had been one of the first things built. When the ground water was trained to the drain, most of it flowed away by gravity, without even having to be pumped.

Steel Forms Used

The job is equipped with approximately 8,000 square feet of Atlas Speed Forms and the necessary Richmond tie rods to hold them together. One setting of the available forms will pour half of the largest structure on the project: the 135-foot-diameter filters.

In the construction of the filters, an unusual field problem has been whipped, and all the key men are quite proud of it. Tile-pipe water pick-up sections are being placed monolithically with the concrete wall sections, including an extremely tough transition reducer section from the end of the tile mouth to the inside of the wall.

The tile sections are set in place first of all, with wood blockout forms to create the reducer section. The tile ends are then mortared to prevent wall concrete from running out during the pour. Since the main problem concerns itself with stripping out the wood blockout pieces, a great deal of attention has been given to that phase. The first few pours were very difficult to strip, and in a few cases the men beat so hard on the blockouts that a few of the tiles were smashed. The blockout pieces are now being greased with a heavy coat of Marfak No. 5, and they drive out from the inspection gallery much easier. So far it has not been necessary to saw the pieces on a bevel, although the problem was at one time so serious that this was considered.

A 2-foot-thick section of the bottom, just above these tiles, is being formed with a panel of plywood nailed to 2 x 4 studs. Directly over this panel come the Atlas steel forms, set up on end with three patented steel and wedge fasteners in each form-panel flange. Most of the Atlas forms are 6 and 8-inch, in 6 and 8-foot lengths.

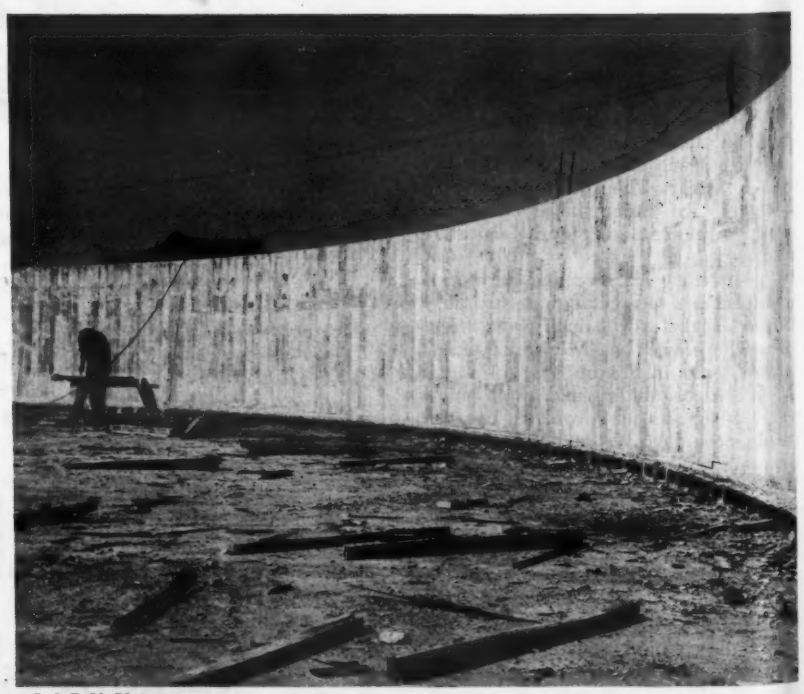
Finished concrete work must be so precise that special bracing precautions are being used. The inside surface of the walls is being held to a true line by 10-foot panel sections of formed, laminated wales, consisting of three 1 x 4 boards nailed together. The Richmond

(*Continued on next page*)

C. & E. M. Photo
Meanwhile, carpenters place inside bracing for the walls of a filter tank. The bracing "kicks" against 2 x 10 fir timbers bolted to the filter floor.

C. & E. M. Photo
Eye-catcher of the job is this swivel-mounted carriage which takes the Pumpcrete line out to the pour. Near the wall line the carriage rests on an old rubber-tired auto chassis.

C. & E. M. Photo
Resident Engineer Ed Morris (at right) and General Superintendent F. J. Becker watch the concrete being trained down to the pour through a flexible canvas spout.



C. & E. M. Photo
A completed section of filter wall. The tile pipe at the bottom looks easy, but one of the major job problems concerned the stripping out of wood blockout pieces.

C. & E. M. Photo
A Hough Payloader smooths backfill behind the wall of the filter tank, as a Reo truck in the background dumps in more material.

C. & E. M. Photo
Iowa State College is paying 30 per cent of the cost of the new Ames sewage plant. Here future engineers from the college look over the project.

tie bolts pass through this wale, through the forms, and are fastened with their cast-iron wedge. The wales are on 3-foot centers.

In order to support the entire wall in its exact position, an extensive system of Roos jacks is being used on the back side, with timber "kickers" on the inner side. About every 5 to 6 feet, vertical 2 x 12 Douglas fir timbers are placed vertically over the wales. The jacks are then placed against the vertical timber, kicking against the high earth bank behind. The inner side is braced by triangular-shaped 2 x 4 braces, closely spaced. These lead from similar timber uprights back to timbers fastened to the concrete floor. At the time the floors were placed, bolts were inserted in the fresh concrete for this purpose.

With the base of the steel forms nailed to the bottom panel of wood, and plenty of spreader blocks inside, the forms cannot move once they are in place. They *could*, of course, but it is not likely that they will, with all the precautionary bracing.

Concrete Batched on Job

Concrete is being proportioned on the project, and sent out to the pouring point by an unsual scheme involving a Pumpcrete machine.

Rock aggregate of 1½-inch maximum size is received from Hallett Rock Co., of Boone, Iowa. The same firm also supplies the sand. These materials are trucked in and dumped direct to the two bins of a CMC batcher, set far enough below the access ramp that the tops of its bins are flush with the ground. In some cases the trucks also stockpile the material, which is then put in to the bins by a Hough Payloader.

Directly under the CMC batcher is a small weigh hopper, equipped with

(*Continued on next page*)

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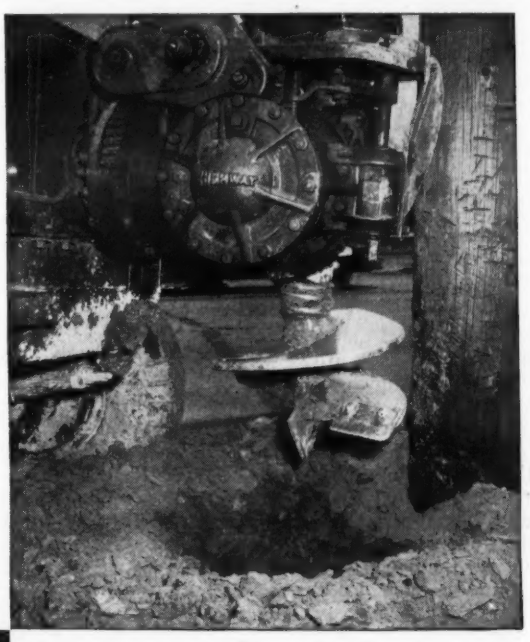

Post Hole Digger now digs 206 holes in rocky soil before repointing

Just 4 holes was the former life of a new point and blade on this power-driven post hole digger. After hardfacing with AMSCO Tube Tungsite, the same blade and point dug 206 holes—*51 times the former service!*

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Sewage-Plant Pours Are Job Eye-Catcher

(*Continued from preceding page*)

beam scales. One man weighs sand and aggregate into this hopper, and then moves the batch about 10 feet to the east over a monorail, where he can dump it in the skip of a 16-S CMC concrete mixer. At the same time, two men working in a small cement house break open 3 sacks of Hawkeye Type II cement and put it in the mixer skip. Each batch consists of 3 sacks of cement; 760 pounds of sand; 1,050 pounds of aggregate; 1½ pounds of Pozzolith, to make the concrete more workable and reduce the water content; and an average of 16 gallons of water.

The materials are mixed 1½ minutes. Water comes from a supply pipe line near by. The fresh concrete, at a slump of from 2½ to 4 inches, is dumped direct from the mixer discharge spout into the receiving hopper of the Rex Pumpcrete machine near by. The Pumpcrete machine then sends the concrete out to the placing point, whether it be close by or 750 feet away.

Lippert Bros. developed an unusual type of swivel joint and carriage, which permits the Pumpcrete machine to work continuously and the concrete to be placed without adding or removing pipe. The pipe from the machine leads through a blocked-out opening in the wall of each structure, to the center point. Here a steel-pipe tripod is located, which supports the weight of the pipe and the rotating carriage at that point.

The swivel joint is located near the top of this tripod. The Pumpcrete delivery line then leads back to the wall line over a steel-truss support carriage, which rests near the wall line on an old automobile rubber-tired chassis. Two men can move this chassis at will, covering the entire pour with no trouble. The swivel joint makes the radius constant, and the rubber-tired carriage permits the pipe line to travel 180 degrees to cover the pour.

A flexible canvas spout leading from the end of the delivery pipe is trained down to the pour. The concrete is placed by running a course about 2½ feet thick across the entire length of the form. Two gasoline-driven Stow vibrators follow the placing gang, vibrating between the steel reinforcing bars to consolidate the concrete. The key men pay so much attention to vibration that they even use mirrors to reflect sunlight down on the concrete so the crew can see exactly what it is doing. It is paying off, too . . . in some of the nicest-stripping concrete seen around that part of Iowa.

When a course has been finished all the way around, the carriage is returned to the starting point, in order to cover the concrete before it takes too much of an initial set. Ordinarily the outside walls of the filters are poured first, and then the inside wall is placed. The joints consist of a formed key, with a metal water stop in some of the most important places.

Exposed concrete, and the masonry exposed by the stripping of forms, is being cured by Hunt Process solution. The forms are stripped and moved ahead in panels about 10 feet long. A Quick-Way truck crane comes in handy for this work.

Flat slabs on floors are either finished off by wood bullfloats or steel-troweled if required by the plans. Where sludge will have to move over the concrete floors, the plans generally require a hard, dense, steel-troweled finish.

Work Through Winter

A great deal of the work was carried on through last winter. By that time many of the structures, including the control house, were built up above the ground, and much of the concrete work was in. During the winter most of the piping and machinery was installed, the filter beds of crushed rock were constructed, and some backfill placed.

Filter arms and other equipment are to be furnished by the Dorr Co. Final clarifier equipment will be furnished by Chain Belt Co.; the Chicago Pump Co. will make the comminutor grinder; Pacific Flush Tank Co. the digester dome, which will be gas-tight; and Sheffield Steel Co. is supplying the steel reinforcement. Electrical work is being installed by Dan Garretson of Boone.

Flow Plan

The sewage flow plan provides for the by-passing of any or all structures beyond the pump house, so that in an emergency, the sewage can be handled by a wide variety of possible combinations.

For routine operation, the sewage will flow to the disposal plant through a 36-inch outfall line, which has already been constructed. This 36-inch line continues through the comminutor and Parshall flume, where floating objects and trash will be removed, into the wet well of the pump house. The pipe line to this point is all concrete.

A 24-inch cast-iron pressure line leads from the pumps to the aerators, where the sewage flows over weirs into the primary clarifiers. Sludge is drawn off at this point, and sent to the digesters. The water effluent then passes through a 24-inch concrete pipe line to a distribution box, and from there through 16-inch cast-iron line to the filters.

A 15-inch concrete line takes effluent water from the filters to collection manholes, where a recirculating pump is located. This provision makes it possible to recirculate the water through the filter beds if necessary.

A 24-inch concrete pipe then takes the water through 2 manholes, one of which is a by-pass, to the distribution box ahead of the final clarifiers. It is distributed through a 14-inch cast-iron pipe line. There is also a sludge draw-off line from the final clarifiers to the digesters, to receive any sludge not removed in the primary clarifiers, aerators, and filters. Effluent from the final clarifier passes by gravity through a

(*Concluded on next page*)

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15-inch concrete line to a chlorine-contact treatment tank. A 24-inch line takes the treated water away through control manholes, and dumps it into the river about ¼ mile east of the plant.

Personnel

The project is being engineered and supervised by the Howard R. Green Co., designing engineers, and Ed Morris is the representative of the firm as Resident Engineer.

For the contractor's end, W. H. Lippert, President of the firm which bears his name, is exercising general supervision, with Art Lees as Chief Estimator and Charles Gruno as General Manager. Field work is under the supervision of F. J. Becker, General Superintendent, who has among his assistants S. J. Gabrielson and Elver Erickson. Erickson, who recently returned to America from a 10-year sojourn in Sweden, considers the United States the last outpost where people are free. Even in Sweden, he said, there is far too much government control.

Completion of the new disposal plant will put Ames and Iowa State College out in front of its sewage-disposal needs for many years to come, it is believed, and will be an effective remedy for pollution which now poisons most of the streams in the midwest.

M-K Controls Ferguson

Morrison-Knudsen Co., Inc., has purchased the controlling stock of The H. K. Ferguson Co., Industrial Engineers and Builders, from the Oman interests of Nashville, Tenn. The purchase was made in the interest of broadening the field of activity of both organizations. Otto F. Sieder will continue as Executive Vice President and General Manager of Ferguson, and no change in management, personnel, or policy of the company is planned.

The Ferguson company was founded in 1918 by the late Harold K. Ferguson. It was reorganized in 1945 following its outright purchase by a group headed by Stirton Oman and John Oman III, who also own and operate the Oman Construction Co. of Nashville.

Especially active in the chemical industry, Ferguson has also taken a prominent part in the atomic-energy program. During the war, it designed, built, and operated the thermal diffusion plant for the manufacture of Uranium-235 at Oak Ridge, Tenn. Following the war, an Atomic Energy Division was created within the organization.

Morrison-Knudsen Co., Inc., was organized in 1912 by Harry Morrison, the present President, and the late Morris H. Knudsen. Its present contracts include a storage dam and irrigation project in Afghanistan, a railway rehabilitation project in Alaska, a dam in Ceylon, and heavy-construction projects in the United States.

Barnes Office in Philly

The John S. Barnes Corp., Rockford, Ill., has opened a Philadelphia sales office. It is operated by Ernest A. Isberg & Co., Theatre Square, Swarthmore, Pa., and serves eastern Pennsylvania, southern New Jersey, and Delaware.

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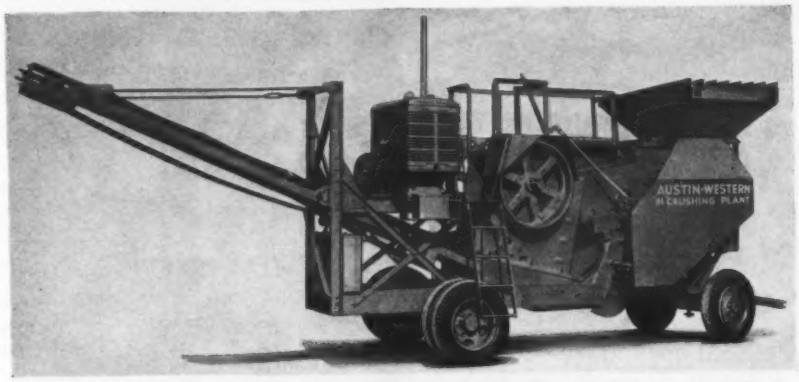


A new arrival in the Austin-Western family of portable crushing and screening plants —the Model 61 single-pass unit.

New One-Pass Plant Crushes and Screens

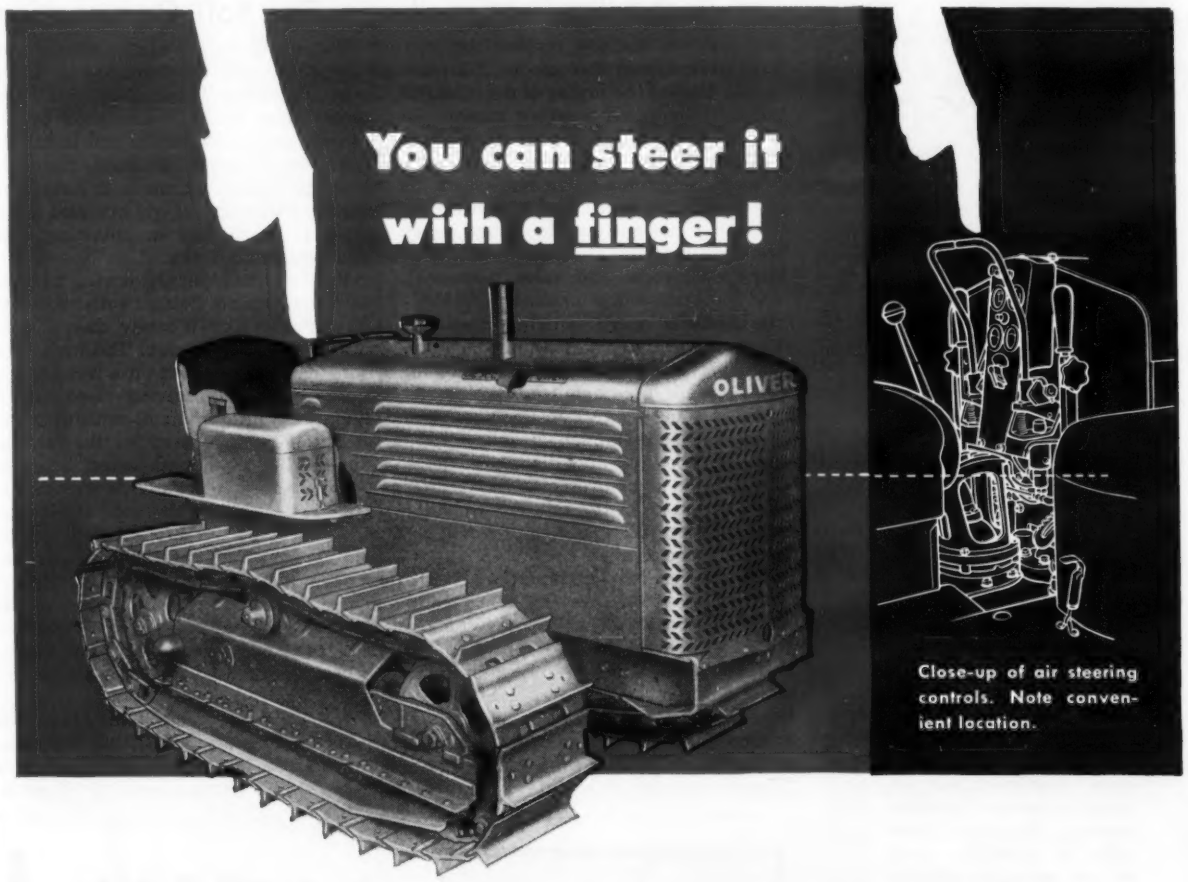
A new crushing and screening plant, designed for economical production of crushed rock or gravel where extreme accuracy in grading to sizes is not required, has been developed by the Austin-Western Co., Aurora, Ill. The new 61 provides a lightweight, fully portable unit of the single-pass type suitable for average road maintenance needs.

The unit has a 1024 jaw crusher (with a 1020 or 1016 optional), a 2 x 4-foot single-deck 4-bearing type of scalping screen, a 24-inch reciprocating-type feeder with an adjustable eccentric for different lengths of stroke, and an 18-inch x 20-foot channel-frame delivery conveyor. The feeder is equipped with a 6-foot-square hopper and grizzly. A standard plant weighs approximately 20,000 pounds and is mounted on 7.50 x 20 pneumatic tires. It requires 30 to 45 hp.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 137.

Bramman Joins B&D

Walter H. Bramman has joined the sales force of The Black & Decker Mfg. Co., Towson, Md. He will live in Spokane, Wash., and work with the company's electric-tool distributors in the eastern part of that state, as well as in Montana and all of Idaho east of Boise. Mr. Bramman was previously connected with the Sales Department of the Shell Oil Co. and specialized in industrial lubricants.



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For complete details, see your Oliver Industrial Distributor or write The OLIVER Corporation, Industrial Division, Cleveland, Ohio.

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Macy's Battles Time (Not Gimbel's) to Get Store Addition Built

"Whew!" sighed E. L. Winn, partner of the Winn-Senter Construction Co. "Whew! This job would normally have taken 2 years, and we had to do it in 15 months. How did we ever manage?"

How indeed? The task of constructing a $7,000,000 7-story addition to Macy's Kansas City department store had been complicated by having to work around an operating store, and by such interruptions as abnormally cold weather, labor difficulties, razing problems, and lease commitments. The answer to Mr. Winn's question is to be found in the cooperation displayed by the architect, Kivett & Myers of Kansas City, the general contractor, Winn-Senter, the 22 subcontractors, and the 900 employees who put in some 2,000,000 man-hours of labor.

J. B. Van Veen, Macy's building representative, coordinated the building schedule of the architects, contractors, and subcontractors around the operating store. The men on the job were rarely more than two weeks behind the men at the drawing boards—once in a while the contractor had to snatch mere architectural sketches from those boards in order to keep going on schedule.

Clipper masonry saws with diamond blades cut Roman brick for the seventh-floor tea room of Macy's addition to its new Kansas City store.

The way M. E. Harrison, Kansas City masonry subcontractor, solved his problems on the job typifies the way they were solved throughout. Harrison superintended the laying of over 700,000 bricks. When cold weather threatened to halt the work of his 65 bricklayers and masons, he put them in canvas-covered individually heated scaffolds and production continued as scheduled.

In some cases it was necessary to lay brick or tile in the immediate vicinity of Macy customers and sales personnel. And because some unusual architectural effects were sought, much of the masonry material had to be custom-cut. This raised a problem of dust in areas where merchandise was in the open and in danger of damage. Mr. Harrison used Clipper masonry saws and wet abrasive and diamond blades to solve the dust problem. All cutting was done next to the masons' working area, so material was always available when they needed it.

The Garden Tea Room on the seventh floor of the store presented a special problem. It was designed by Gruen & Krummeck, Architects, of Los Angeles and San Francisco. The unusual effects which were created by the use of Roman brick along wall areas and around pilasters in the room made it necessary to do a lot of cutting. Again Clipper masonry saws were used. Harrison said they reduced time and labor by about 27 per cent. He also gives a special vote of thanks to Clipper suppliers for their policy of same-day shipment.

Study of Equipment For Soil Compaction

Recent British experiments in soil compaction will be of interest to American engineers. "Road Research Technical Paper No. 17" published by the Department of Scientific and Industrial Research, London, England, describes these investigations made to determine the effectiveness of rollers and other types of machinery in obtaining adequate soil compaction.

Various machines were used to compact five typical British soils: a heavy clay, a silty clay, a sandy clay, a sand, and a gravel-sand-clay. The investigations were carried out on a large circular covered track, giving close control over the rolling and soil-moisture conditions. Machines used for the test included a 2¾-ton smooth-wheel roller, an 8-ton smooth-wheel roller, a pneumatic-tire roller, a club-foot sheepsfoot roller, a taper-foot sheepsfoot roller, and a frog rammer. The report describes the performance of the different machines in relation to the moisture content of the soil, the number of passes required to obtain a given degree of compaction, and the thickness of the layer.

This paper may be obtained from the Sales Section of the British Information Service, 30 Rockefeller Plaza, New York 20, N. Y., at a cost of 40 cents.

Concrete-Curing Method

A bulletin about concrete curing with Ritecure, a colorless membrane, has been prepared by The Johnson-March Corp., 1724 Chestnut St., Philadelphia, Pa. It describes the compound and reports the results of moisture-retention, wear-resistance, and compressive-strength tests. Photographs illustrate application techniques.

Available with this bulletin is a 26-page report on four tests made to determine the effectiveness of Ritecure surface applications as a means of curing concrete and mortar. Comparative tests were conducted on specimens stored under standard moisture conditions and in laboratory air; as well as on specimens surface-treated with Ritecure applied immediately after molding and after 24 hours of wet-burlap curing. Complete specifications on the product are also included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 116.

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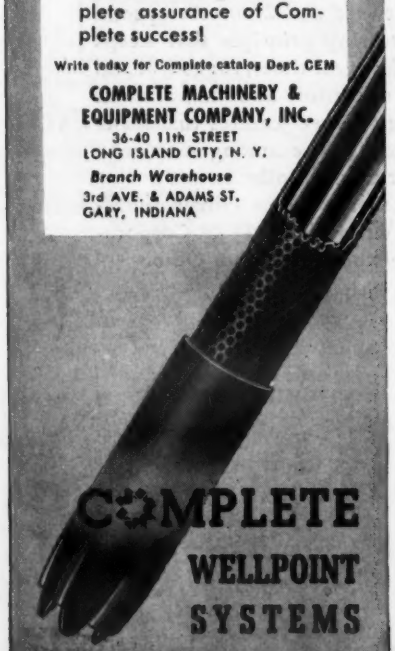

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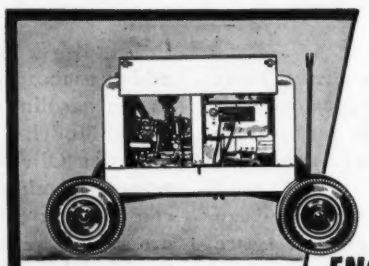

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NEWARK PHILADELPHIA PITTSBURGH CLEVELAND
E. CHICAGO, IND. MINNEAPOLIS SO. SAN FRANCISCO

DIXIE CUPS help save MAN-HOURS

Clean, fresh Dixie Cups, and cone-shaped Vortex Cups, help check the spread of colds and other mouthborne contagions. Keep your men on the job.

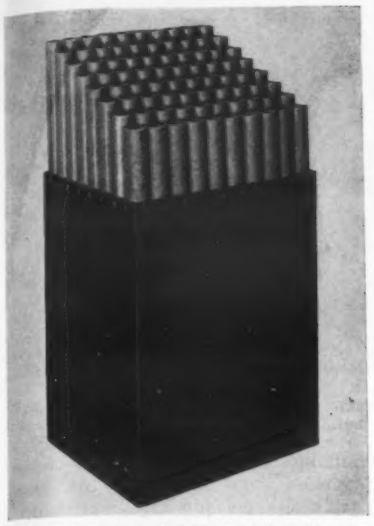
DIXIE PORTABLE WATER CARRIER

Always on the job, crews don't leave their work. Insulation keeps water cool for hours. Ruggedly built for years of use! Cover and lining of stainless steel for cleanliness.

USES EITHER
DIXIE CUPS or VORTEX CUPS

"DIXIE" AND "VORTEX" ARE REGISTERED TRADE MARKS OF THE DIXIE CUP COMPANY

FREE ILLUSTRATED FOLDER
Write to DIXIE CUP COMPANY
Easton, Pa.



The Tubrak, a metal bin which holds 80 tubes to protect maps, drawings, etc.

A New All-Metal Bin To Protect Drawings

A new metal bin designed to protect maps, drawings, and tracings in a neat and orderly manner is made by Scott-Rice Co., 610 S. Main, Tulsa, Okla. The Tubrak, as it is called, holds eighty 2 x 36-inch tubes. The bin is 22½ inches wide, 18¼ inches deep, and 30 inches tall. Numbered front rows and lettered side rows provide easy indexing. A transparent Vinal plastic covering protects the drawings.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 126.

A New 107-Hp Truck

A new Model E-20 truck powered by a Gold Comet 107-hp engine has been announced by Reo Motors, Inc., Lansing 20, Mich. It has a gross vehicle weight of 16,000 pounds as a truck and 26,500 pounds as a tractor. The Gold Comet engine has a 255-cubic-inch displacement and features removable wet-cylinder sleeves and a seven-bearing crankshaft. The Model E-20 is available in four standard wheelbases ranging from 125 to 187 ¾ inches, with tire sizes up to 8.25 x 20 duals available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 96.

Marion Names New Director, District Sales Managers

John P. Courtright was elected to the Board of Directors of the Marion Power Shovel Co., Marion, Ohio, on February 28, at a meeting in New York City. He replaces Stanley R. Grant. Mr. Courtright has been with Marion since 1927 and has been Vice President in Charge of Sales and Service for several years. He was also recently elected President of the Power Crane and Shovel Association.

Marion also announces that it has appointed W. D. Calland and Ernest J. Riggs District Sales Managers in San Francisco, Calif., and Phoenix, Ariz. Calland, who succeeds Edward R. Daley, represents Marion in all of California; in the Nevada counties of Washoe, Humboldt, Pershing, Churchill, Storey, Ormsby, Lyon, Douglas, Mineral, Esmeralda, Nye, and Clark; and in Yuma County, Arizona.

Riggs handles all of Utah; all of Arizona except Yuma County; the Nevada counties of Elko, Eureka, Lander, White Pine, and Lincoln; the Idaho counties of Oneida, Franklin, and Bear Lake; the Wyoming counties of Lincoln and Uinta; and Grant County, New Mexico.

Aggregate-Plant Equipment

A 68-page catalog dealing with a full line of equipment for aggregate production is available from the Gruendler Crusher & Pulverizer Co., 2915 N. Market St., St. Louis, 6, Mo. Photographs and specifications are given for portable, semi-portable, and stationary plants; jaw, roll, and hammermill crushers; and such auxiliary items as feeders, bins, screens, and conveyors. All of the photographs in Bulletin BR-35-5 are full-page size and most of them show the equipment in field operation.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 38.

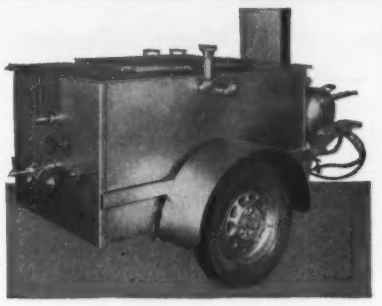
White Oil-Jacketed Kettles for Heating Elastic Joint Filler

Joint-filling compounds containing rubber for elasticity, must have indirect heat application. They melt at 375° and must not exceed 425°. White Model F-10 kettles maintain this temperature accurately by oil jacket which transfers heat to the compound. White kerosene burners are safe, dependable, easily controlled. Hand operated agitator. Insulated housing. Other kettles for paving maintenance have FIRE-PROOF tops. Hand or engine sprayers. Several sizes.

Write for Circular

White Mfg. Co.

Elkhart, Indiana



Other Products

ASPHALT PLANTS
CONCRETE VIBRATORS
TRACTOR LOADERS
KEROSENE TORCHES

SASGEN
New Electric-Powered CHAMPION DERRICK

Boom only can be supplied for use with old-style mast and bottom

Single line cap. 300 # @ 100 feet per minute

Double line cap. 600 # @ 50 feet per minute

The most complete line of contractors' derricks, hoists, and winches. Write for catalog.

The Sasgen line is handled by leading equipment distributors everywhere.

SASGEN DERRICK COMPANY
3131 W. Grand Avenue, Chicago 22, Ill.

TODAY...
Just As You Wouldn't Use A Horse and Buggy
•
You Wouldn't Use An Old Model Air Compressor
•
When You Can Use The SCHRAMM Pneumatractor

The SCHRAMM *Pneumatractor* may very aptly be termed the "Newest of the New"—a self-propelled air compressor literally packed with far advanced features that put it in a class by itself. Its desirability over an old model air compressor can be likened to your preference for the modern automobile over the horse and buggy.

Here is *why* you should choose the SCHRAMM *Pneumatractor*. It can be easily transported . . . is strong, rugged, husky . . . and costs less than a separate tractor and separate compressor. Moreover, it is so flexible you can use it for an endless variety of compressed air jobs!

Going hand-and-hand with the *Pneumatractor* is the complete line of SCHRAMM auxiliary equipment also available . . . *approved* equipment which will enable you to do your job better.

Write today for Bulletin NEU-50B describing this most modern of air compressors and auxiliary equipment. In today's compressed air needs, you will find the *Pneumatractor* a "must".

Model 105 *Pneumatractor*
(also available in 60 cu. ft. size)

SCHRAMM INC.
The Compressor People
WEST CHESTER • PENNSYLVANIA

Dealer Serves City And Helps It Grow

The Story of Miami's Growth Is Incomplete Without a Credit Line to the Distributor Who Supplied the Tools for It

✦ THE continuing growth and development of Miami, Florida, on its present grand scale, has been possible only because of the continuing growth and development of construction machinery to speed the physical expansion of this subtropical city. The new causeways, bridges, streets, roads, airport enlargements, drainage improvements, etc., so much in evidence, have resulted from the proper application of the proper tools of the construction industry. These tools, ranging in size from a power saw to a power shovel, are supplied and serviced by a man vital to the overall construction machine—the equipment distributor. Any local history of Miami's recent growth would not be complete without a credit line to the Florida-Georgia Tractor Co., which has been distributing to contractors the equipment they need to do their job.

The Florida-Georgia Tractor Co. is one unit in the big network of A. E. Finley & Associates, the nation's largest distributors of construction and industrial equipment. The parent outfit is comprised of four well known firms: North Carolina Equipment Co., Hampton Roads Tractor & Equipment Co., Southern Equipment Sales Co., and Florida-Georgia Tractor Co. It has facilities for sales, parts, and service, in 15 cities, spread out over 5 southeastern seaboard states from Norfolk, Virginia, to Miami, Florida, and gives employment to a force totaling over 700 men.

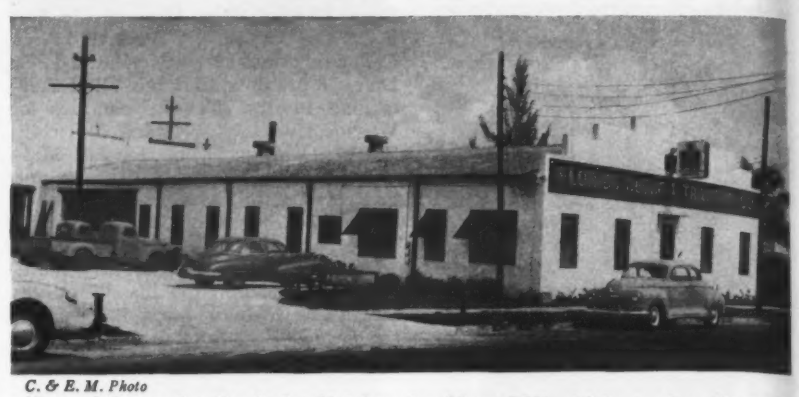
In the beginning, the organization started in Raleigh, N. C., with the North Carolina Equipment Co., and A. E. Finley still maintains the general offices for his companies in the capital of the Tarheel State. Founded only 16 years ago, the Finley firms have since expanded into Virginia, South Carolina, Georgia, and Florida. Virginia's lone representation is in the Norfolk area. Besides Raleigh, the other North Carolina cities under the Finley flag stretch from Asheville in the western mountain region, through Guilford and Charlotte, to Wilmington in the coastal lowlands. The South Carolina distributor is stationed at Columbia, the state capital.

Florida-Georgia Tractor Co.

In 1941, the subsidiary Florida-Georgia Tractor Co. was founded with headquarters in Jacksonville, Fla., just south of the Georgia border. Since then branches have been opened at Savannah and Waycross, Georgia, and in 5 other Florida cities—Tallahassee, the capital, and Orlando, Tampa, Lakeland, and Miami. General offices for this firm are at Lakeland. The Florida-Georgia Tractor Co. serves the entire state of Florida and 25 counties in southeastern Georgia.

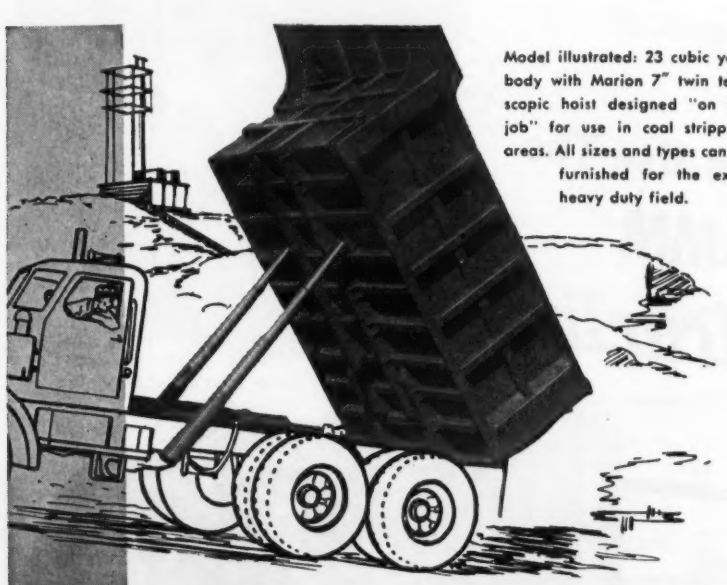
Like the other Finley firms, the Florida-Georgia Tractor Co. has the International Harvester Co. industrial power line of products as its principal and earliest account. At each location there is a large stock of parts for International tractors and International diesel engines, a track press, a test stand for fuel-injection pumps, and enough competent mechanics to service the equipment that is sold. At certain key points in the chain the company carries a complete stock of parts for Northwest shovels, cranes, and draglines; Galion motor graders and rollers; Euclid hauling equipment; Galion dump bodies and hoists; and many other miscellaneous lines.

(*Continued on next page*)



C. & E. M. Photo

Many of the construction tools which have transformed Miami into a metropolis came from this one-story white and green building on N. Miami Avenue.



Model illustrated: 23 cubic yard body with Marion 7" twin telescopic hoist designed "on the job" for use in coal stripping areas. All sizes and types can be furnished for the extra heavy duty field.

When The Job Is Extra Tough Marion "On The Job" Design Pays Extra Dividends

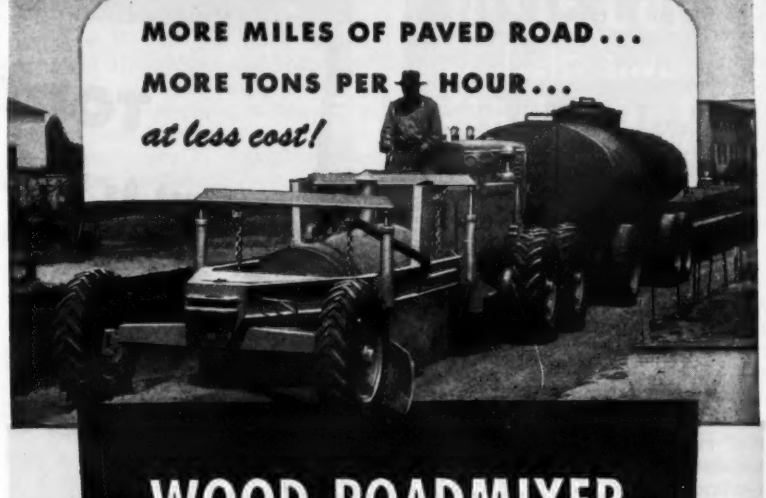
When extra heavy loads cause unusual strain, Marion Telescopic Hoists really pay off . . . in extra performance, better flexibility and longer life. That's because each Marion unit is designed under actual day-by-day work conditions . . . with special features "built in" for the particular job. Check the advantages of a Marion Telescopic Hoist designed "on the job" for your extra heavy duty hauling.

GET MORE DETAILS NOW

Just mail a post card or letter for the complete Marion catalog, or ask your Marion Distributor.

MARION BODIES AND HOISTS

MARION METAL PRODUCTS CO., MARION, OHIO



WOOD ROADMIXER

The Wood Roadmixer is your best answer to modern low cost mix-in-place construction. Here's why:

LESS MANPOWER—this *one man operated* traveling mixing plant takes low cost native materials and thoroughly mixes with emulsion, road oil or soil cement binders in one pass—windrowed and ready for spreading and compaction.

HIGH PRODUCTION, LOW COST—up to 350 tons mixed per hour at less than 7 cents a ton is not uncommon.

FULL JOB CONTROL—from start to finish. You control the rate of travel, the pressure of binder, the uniform pickup of material. With measured windrow and supervision of aggregate you're assured a surface of uniform quality every time!

SELF PROPELLED—to and from the job speeds of 15 MPH and working speeds up to 40 ft. per minute!

MORE THOROUGH MIXING—pug mill mixing drum provides 200 mixing passes in 45 seconds! Compare this to the 1 to 4 passes provided by other mixers.

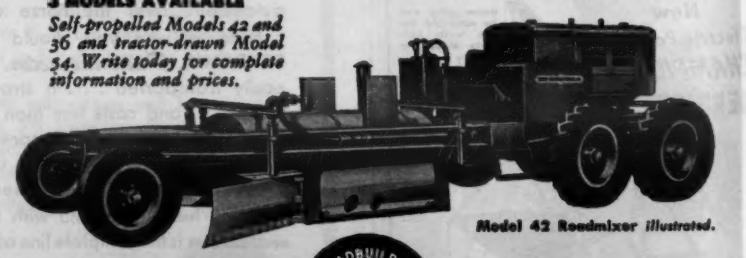
MANEUVERABLE as a motor patrol—uses pneumatic tires. Assures adequate traction in low bearing soils.

PLENTY OF ROADBUILDING APPLICATIONS—surfaces secondary roads, airfields, road shoulders, parking areas and detours. Subsurfaces major roads and airfields.

ACCEPTED AND RECOMMENDED by a majority of state highway departments, by the Civil Aeronautics Authority, U. S. Bureau of Public Roads, and the U. S. Army and Navy.

3 MODELS AVAILABLE

Self-propelled Models 42 and 36 and tractor-drawn Model 54. Write today for complete information and prices.



Model 42 Roadmixer *illustrated.*

ROADBUILDING EQUIPMENT

WOOD MANUFACTURING CO.

BOX 620 · 6900 TUJUNGA AVENUE · NORTH HOLLYWOOD, CALIF.

C. & E. M. Photo
J. F. McCoy (on the phone) has been with Florida-Georgia Tractor Co. since it was founded. He is Office Manager at Miami. That's Field Sales Manager O. C. Johnston standing by, waiting to talk over a big deal.

C. & E. M. Photo
A Florida-Georgia mechanic works on track shoes for an International TD-6 tractor. Notice the overhead hoist which runs the length of the shop.

Among the other prominent trade names represented in the equipment distributor's accounts are Barco, Braden, Bucyrus-Erie (tractor accessories), Carco, Cedarapids, Cleaver-Brooks, DeWalt, Disston, Elgin, Etnyre, FWD, Haiss, Heil, Heltzel, Hendrix, Hough, Jaeger, M-B, Parsons, Rogers, Thor, Towmotor, Trojan, Tru-Lay, Wheland, and Whiteman.

Miami Office

In 1943 the Miami office was opened to serve 13 counties in the southern tip of the peninsula from Fort Pierce south to Key West. While the company does not sell equipment to foreign buyers, requests for parts have been received from countries in Central and South America, and such orders are handled promptly. The No. 1 customer is the contractor engaged in road, street, or airport construction. After him comes the aggregate producer, or the mine and quarry operator with his crushing plants, followed by the building contractor. Growing in importance every year is the drainage contractor, a steady customer in the dragline department, who is transforming a large acreage of swamps and everglades into profitable farming country by digging ditches and canals to drain them.

Florida-Georgia Tractor Co. distributes no agricultural machinery. But equipment from this agency has seen service in the development of many industrial sites in the lower Florida area.

New highways and streets in and around Miami are being built with equipment from F-G, and the big expansion program at the Miami International Airport is a source of varied business. Both Eastern Air Lines and Pan American Airways, for instance, have overhaul and maintenance shops at Miami which are as large as any in the world. The equipment distributor plays a part in this work, just as he did

(Concluded on next page)

Bituminous DISTRIBUTORS with Original Rosco Features

For over 20 years, we've pioneered features that are now universally accepted . . . Automatic Pressure Metered application . . . patented V-Jet nozzles . . . folding safety spraybar. These are features that will save you money on the job. **Write for literature.**

ROSCO MINNEAPOLIS ROAD OIL DISTRIBUTORS STREET FLUSHERS and CLEANERS • MAINTAINERS

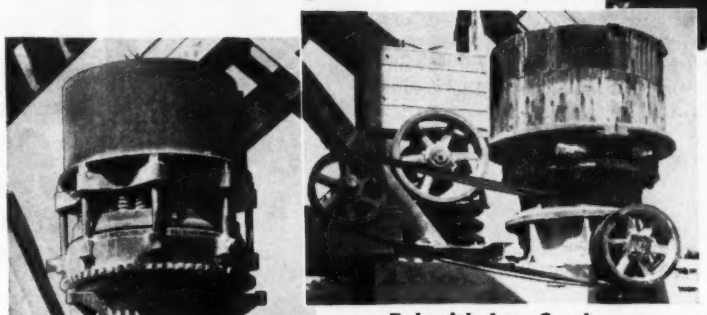
ROSCO MFG. CO. ● 3124 Snelling Ave. ● Minneapolis 6, Minn.

CRUSHING 500,000 TONS for Pennsylvania Turnpike

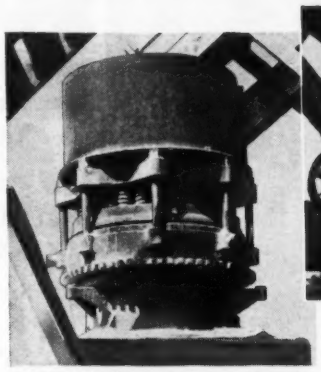
Eastern Extension

TELSMITH®

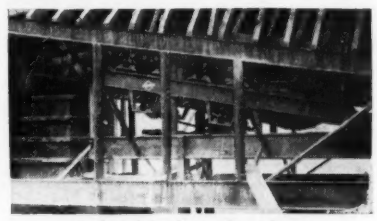
Telsmith Scalping Screen



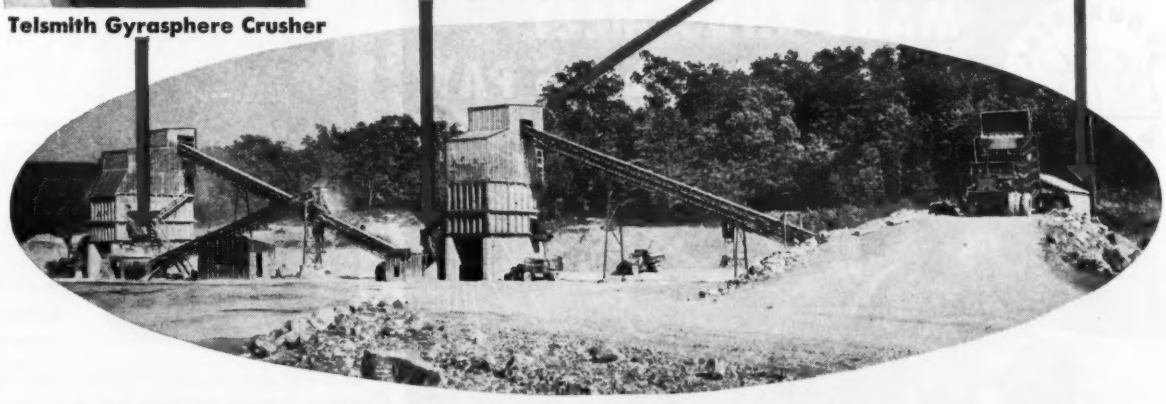
Telsmith Jaw Crusher
Telsmith Gyratory Crusher



Telsmith Gyrasphere Crusher



Telsmith Jaw Crusher
Telsmith Apron Feeder



Building the Pennsylvania Turnpike Eastern Extension brought an abnormally large demand for aggregate in Lebannon and Lancaster Counties. Pennsylvania Aggregates, Inc., built this completely new, Telsmith crushing plant at Cornwall to supply part of this temporary demand—about 500,000 tons in 15 months' time. Typically Telsmith, plant operation is smooth; up-keep is low; and production high—200-250 tons hourly, making a maximum of minus 2¼" in four different sizes.

TELSMITH Equipment in This Plant

42" x 14' Heavy-Duty Apron Feeder • 30" x 42" Roller Bearing Jaw Crusher • 30" x 150' Primary Conveyor • 5' x 12' 2-Deck Heavy-Duty Scalping Screen • 10" x 36" Roller Bearing Jaw Crusher • 13B Gyratory Crusher • 30" x 149' Conveyor • 5' x 12' 3-Deck Vibro-King Sizing Screen • No. 36 Fine Crushing Gyrasphere Crusher • 24" x 83" Return Conveyor.

Get Bulletin 266—Telsmith Complete Plant Service.

Q-22

SMITH ENGINEERING WORKS, 4014 N. HOLTON ST., MILWAUKEE 12, WISCONSIN

Cable Address: Sengworks, Milwaukee

51 East 42nd St. New York 17, N.Y. · 211 W. Wacker Drive Chicago 6, Ill. · 718 Commercial Trust Bldg. Philadelphia 2, Pa. · 238 Main Street Cambridge 42, Mass. · Boelck Eqpt. Co. Milwaukee 3, Wis. · Brandeis Machinery & Supply Co. Louisville 8, Ky., & Evansville, Ind.

Clyde Equipment Co., Portland 9, Ore., & Seattle 4, Wash. • Mines Eng. & Eqpt. Co., San Francisco 4, Calif. • Interstate Equipment Co., Statesville, N. C. • Rish Eqpt. Co., Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 10, Va. • Wilson-Wessner-Wilkinson Co., Knoxville 8, & Nashville 6, Tenn.

Dealer Serves City And Helps It Grow

(*Continued from preceding page*)

in the new Rickenbacker Causeway which connects Miami with undeveloped Biscayne Key.

Small Beginning

When Florida-Georgia Tractor Co. came to Miami, it bought a building at 3139 N. Miami Avenue on land leased from the Florida East Coast Railway. The plot of ground is roughly about 400 feet square, and at the rear is served by a siding of the F. E. C. Railway. The original building has a 65-foot front on the street, and is 100 feet deep. It is a single-story structure of concrete block, covered with stucco, and painted white with a green trim. Here are the offices, equipment for storage and display, and a stock room for parts.

Later, a new building of approximately the same size was constructed across the rear of the original structure to form a T-shaped layout. The new building, of concrete-block construction, is taller, having a 20-foot height with a roof supported by trusses. It is used as a repair shop. Together, the buildings total 13,000 square feet of floor space.

The executive offices are on both sides of the street entrance to the original building. The walls are attractively paneled with yellow pine. From the service angle, one of the most important features of office equipment is the Kardex system by which a perpetual inventory of parts is always maintained. Down one side of the building, at the rear of the office, is the stock room for parts and the service counter. After the hectic post-war years, the parts situation is about back to normal. There is an average of $65,000 worth of parts on hand, and if any item should be out of stock it can be obtained overnight from one of the other distributors in the firm. Direct wire service to all the branches permits this promptness.

The Shop

When equipment is in need of service, a mechanic may be dispatched to make the repairs right on the job as quickly as possible. He may be flown to the spot if it is far enough away, or the machine may be brought to the shop—usually by the owner, but the distributor has a Rogers trailer for that purpose if necessary. The trailer is also used for delivering equipment to remote parts of the territory, or for transferring it around from one branch to another. A timber ramp in the yard facilitates loading and unloading. Equipment is usually cleaned outdoors with a Homestead steam cleaner before it enters the shop.

Sliding wooden doors, 16 feet wide x 19 feet high, in three sides of the shop permit such tall machines as draglines to enter. The floor is a solid concrete slab, and overhead an I-beam rolls along on tracks supported on the side walls to permit a hoist to reach every part of the shop. The room is well ventilated and illuminated with the three doors, windows at the side, and a skylight in the roof. Overhead lights also are available.

Along the rear wall of the shop is a workbench equipped with small tools and vises. More sizable equipment is also on hand such as drill presses, power saws, an Ingersoll-Rand air compressor, and a Rodgers 100-ton hydraulic press. The shop rebuilds a good many brooms in the course of the year, installing palmyra fibers from India or native hickory with a broom-core-winding machine. Brooms are used in road work, street cleaning, at the race tracks or airports.

At one end of the big shop is a small office for the foreman, and next to that is a closed room that serves as an injection-pump laboratory where tests are conducted on the delicate fuel mechanism for diesel engines. Mechanics engaged in this work attended special classes on the subject at the International Harvester plant in Chicago. Above the shop office and lab is a dressing room with hot and cold showers for the employees.

Personnel

Employees of A. E. Finley & Associates in most cases have grown up with the firm. This is the principal reason that there are no women in the organization, not even a stenographer or switchboard operator. These duties are handled by young men who are given an opportunity to advance in the company. D. J. Jones, for instance, who is Executive Vice President at the Raleigh headquarters, started in as a stenographer to A. E. Finley, President and Chairman of the Board.

"Built on Service" is the company slogan, and every man in the organization has two cards on his desk on which are printed these A. E. Finley mottoes: "Leadership by Performance Pays Greater Dividends Than Leadership by Conversation" and "An Understanding Today Avoids a Misunderstanding Tomorrow". The employees take these very seriously, and live up to their intent.

The Miami office employs 15 men headed by lanky 6-foot-4 J. F. McCoy, 27-year-old Office Manager, who has been with the Florida-Georgia Tractor Co. since it was founded in 1941, except for a 3-year stint in the Army. H. J. Midgette, 46, is Vice President, Operating Department, and O. C. Johnston, 46, is Field Sales Manager. These three came to Miami from North Carolina. Other key personnel at Miami include Bill Martin, Service Manager, and R. C. Schipski, Parts Manager.

During the winter when the Florida resort season is at its height, the Miami office of the Florida-Georgia Tractor Co. probably gets more construction visitors than any other equipment distributor in the country. A part of the office, in fact, is turned over to equipment-manufacturing executives who mix in a little business with their fun while vacationing in Miami.

But the main business of the company is carried on in summer as well as winter. Prompt delivery of equipment is made in all seasons, and service is maintained on the same reliable level day in, day out.

Goodyear Loss and Changes

Edward W. Stephens, 51-year-old Manager of Belting Sales for The Goodyear Tire & Rubber Co., died last May at his home, following a long illness. Known everywhere for his faith in the feasibility of overland conveyor belts, Stephens master-minded the tough belting jobs at Grand Coulee Dam, Shasta Dam, Anderson Ranch Dam, and Bull Shoals Dam.

Goodyear also announces organization changes in its Mechanical Goods Sales Division. R. C. Stein is now Manager of Molded Goods Sales at the St. Marys, Ohio, plant. R. E. Chapman heads Hose Sales at Akron, succeeding R. W. Sanborn, who now represents the division in the Akron territory. And H. R. Comstock now manages the Central Division of Goodyear's Mechanical Goods Sales, replacing H. E. Langdon. The Central Sales Division consists of Chicago, Detroit, Minneapolis, and Cincinnati.

Waterproof Base Plates

A circular describing Keystone waterproof base plates has been prepared by Keystone Asphalt Products Co., 43 E. Ohio St., Chicago 11, Ill. These base plates, the catalog points out, are designed to prevent infiltration of sand, silt, and water at the bottom of a joint and to reduce pumping and pumping damage.

Detail drawings in the circular illustrate base-plate installation under tongue-and-groove longitudinal center joints and contraction joints, under fiber transverse expansion joints, under dummy or contraction joints, and with a typical load-transfer unit. Dimensions, physical characteristics, specifications, and a brief description of the product are also included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 14.

MAKE ENDS MEET *because* BOTH ENDS PAY

QUALITY CONTROL IN MM FACTORIES ASSURES DEPENDABLE PERFORMANCE ON THE JOB!

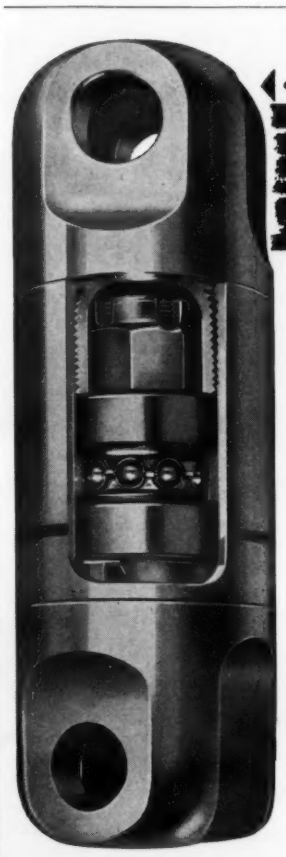
MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA

MM Industrial *Wheelers* are fast, easy to steer, and simple to operate. Perform complete trenching operations when equipped with rear-mounted hydraulic back-hoe and front-end loader! 5,000—10,000 pound front-end capacity. Amazingly economical to own and operate! 27 hp or 49 hp. Available with combination of attachments for construction or maintenance jobs.

Send complete facts on MM Industrial Wheelers.

Attachments Wanted.....
Name.....
Address.....
City.....State.....

IT'S NEW! See the RTI equipped with the only fluid-driven pick-up and dump-type sweeper!



"NEEDED ON ALL WIRE LINES"

For Concrete Buckets, Demolition Balls, Hoisting and Traveling Blocks

Miller "THE ORIGINAL" SWIVELS

ELIMINATE WIRE LINE TWIST AND KINKING UNDER MAXIMUM LOAD

- SAVE TIME—No time lost with spinning loads. No tag lines needed. Operations speeded.
- SAVE MONEY—Lines last longer. More efficient use of men and materials.
- SAVE LIVES—Operator has greater control of load. Danger of wire lines breaking greatly reduced.

5 to 1 safety factor, Highest strength alloy steel, Tested and Approved, Most efficient angular thrust ball bearing design, sealed against water and dirt. Available nationally, All types and sizes.

WRITE FOR FULL INFORMATION AND PICTURES OF SWIVELS IN USE

GENERAL MACHINE & WELDING WORKS
1100 EAST SECOND ST. • POMONA, CALIFORNIA

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Distributor Doings

Ed Reed Manages Penn Sales

R. E. Reed is now Sales Manager of Construction Equipment for the H. O. Penn Machinery Co., New York and Connecticut distributor of Caterpillar tractors, earth-moving equipment, and diesel engines; Bucyrus-Erie shovels; T. L. Smith concrete mixers; etc. Ed Reed, as he is known to the trade, will have under his direction 26 Penn sales representatives. He himself was one in the Manhattan area just before his promotion. From 1943 to 1945 he helped the late Hamilton O. Penn organize the Michigan Tractor & Machinery Co. in Detroit, Michigan, and served as Sales Manager. During the war he went to Washington with the Construction Machinery Division in charge of used equipment under Mr. Penn, who headed up the division.

Hopkins' Has Dealer Openings

Dealers interested in handling oil and gas-burning equipment for asphalt-plant driers should get in touch with Hopkins' Volcanic Specialties, Inc., 201 Hartzel Ave., Alliance, Ohio. The company has distributorships open in several territories.

Onan Distributor in Memphis

The Hawkins Equipment Co., 1475 Thomas St., Memphis, Tenn., is now handling D. W. Onan & Sons, Inc., electric generating equipment in Tennessee, Kentucky, Arkansas, and Missouri. W. C. Hawkins is President of the firm and S. P. Wiley is General Manager.

Bucyrus Line in Ohio, Texas

The Southern Ohio Equipment & Supply Co., Inc., 445 Woodlawn Ave., Zanesville, Ohio, now handles excavators made by the Bucyrus-Erie Co., South Milwaukee, Wis. It sells and services ⅜ to 4-yard gasoline, diesel, and single-motor electric excavators in 16 counties: Athens, Coshocton, Gallia, Guernsey, Harrison, Hocking, Jackson, Lawrence, Meigs, Monroe, Morgan, Muskingum, Noble, Perry, Vinton, and Washington.

Contractors Machinery Co., San Antonio, Texas, is distributing B-E excavators in south-central Texas. Its territory is bounded by and includes these counties: on the east, Aransas, San Patricio, Bee, Karnes, Gonzales, Caldwell, Travis, and Burnet; on the north, Llano, Mason, Menard, Schleicher, and Crockett; and on the west, Val Verde. San Antonio headquarters of the distributor are at 302 Dora St.

Federal Motor Names Franks

W. H. Franks is now Factory Sales Representative in the Atlanta region for the Federal Motor Truck Co. of Detroit. He will direct dealer relations and sales activities for the company in northern Georgia, Alabama, and Mississippi.

Hoist-Tower Dealerships Open

Distributors who would like to handle the Sonco concrete and material-hoisting tower should get in touch with J. S. Roes, Techno Exports, 15 Whitehall St., New York 4, N. Y. The hoist comes in three models and will operate to heights of 300 feet or more. Capacities are ¼, ½, and 1 yard.

Six Dealers for Fairfield

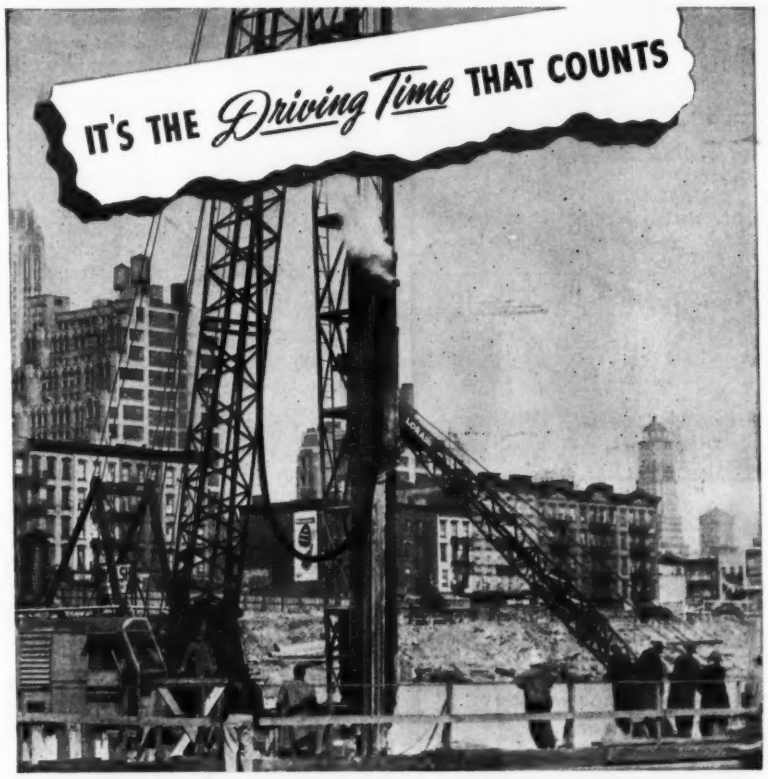
The Fairfield Engineering Co., Marion, Ohio, has appointed six new distributors for its elevating, conveying, and mixing machinery. Capitol Equipment Co., Inc., of Harrisburg, Pa., will represent Fairfield in central and northeastern Pennsylvania; and Frantz Equipment Co., of Philadelphia, in southeastern Pennsylvania and southern New Jersey. Southeastern Texas is the territory of F. S. Ray Co., Houston. Louisiana and southern Mississippi are allotted to Kelleher Engineering Sales Co., New Orleans. Alabama and western Florida goes to Lou Garris Equipment Co., Birmingham. And finally, Lyons Machinery Co., of Little Rock, is the Fairfield representative in Arkansas.

New Line for Missouri-Illinois

Missouri-Illinois Tractor & Equipment Co., St. Louis, Mo., is now an authorized distributor in St. Louis and the surrounding area for the Construction Machinery Co., Waterloo, Iowa. MIT will offer complete sales and parts

(Concluded on next page)

Powell Equipment Co., Ltd., Caterpillar dealer in Winnipeg, Manitoba, Canada, remained on 24-hour duty for three weeks to supply and service flood-fighting equipment when the Red River went on a rampage last May. Here Powell's General Manager, Fred Nunneley, points out for city officials the Caterpillar D397 electric set which generated power for pumps supplying over 10,000,000 gallons of drinking water a day to flood-stricken Winnipeg.



CONTINENTAL'S PILE DRIVING HOSE ELIMINATES COSTLY SHUT-DOWNS!

When pile driving hose "strips" its tube and clogs the hammer-head, the driving operation grinds to a stop. You can prevent these costly shut-downs with Continental's Pile Driving Hose. The tube is "locked" to the carcass. You just can't pull it loose without tearing the hose to pieces. Continental's Pile Driving Hose is an 8-ply, heavy-duty workhorse that *stays* on the job . . . and helps protect your profit.

* * * *

Equip your rigs *now* with Continental's Pile Driving Hose.

PROMPT DELIVERY FROM "NEAR-THE-JOB" WAREHOUSES

To get "right-away" service, call the nearest Continental branch listed below. These warehouses carry large stocks of hose, couplings, boots, clothing and gloves. Get acquainted *now* with prompt, dependable Continental Warehouse Service.

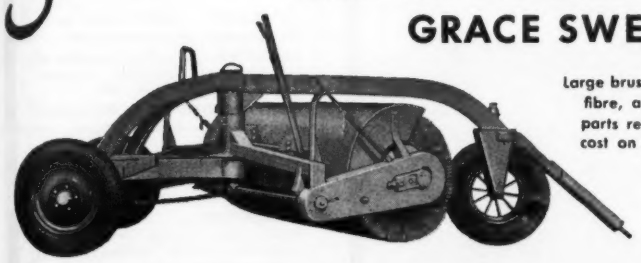
Rubber by **CONTINENTAL RUBBER WORKS**

1989 LIBERTY BOULEVARD • ERIE, PENNSYLVANIA

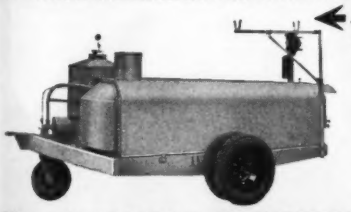
BRANCHES

Baltimore, Md.	Cleveland, Ohio	Kansas City, Mo.	Pittsburgh, Pa.
Boston, Mass.	Dayton, Ohio	Los Angeles, Calif.	Rochester, N. Y.
Buffalo, N. Y.	Detroit, Mich.	Memphis, Tenn.	St. Louis, Mo.
Chicago, Ill.	Hartford, Conn.	New York, N. Y.	San Francisco, Calif.
Cincinnati, Ohio	Indianapolis, Ind.	Philadelphia, Pa.	Syracuse, N. Y.

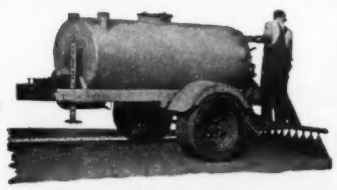
Sweep **MORE MILES PER DOLLAR with 36" Dia. Brush on GRACE SWEEPERS**



Large brush, chock full of fibre, and few moving parts reduce operation cost on Grace sweepers.



More **ASPHALT HEATED**
Less Flue Repairs with RAPID-FIRE CIRCULATING HEATER for Tank Cars



The RAPIDSPRAY MAINTENANCE DISTRIBUTOR Vacuum Cleans *both* Spraybar and Handspray and has other time-saving features.

W. E. GRACE MFG. COMPANY
6003 Lamar Street **Dallas, Texas**

Distributor Doings

(*Continued from preceding page*)

service on the CMC line at its St. Louis and Charleston, Mo., and its Quincy, Ill., divisions. Glen Walter is President of this distributor firm and Frank M. Adams is Vice President and Sales Manager.

Turbine Territory Enlarged

Turbine Equipment Co., New York City representative of Yeomans Brothers Co., Chicago, has been assigned several counties of upper New York State. Through offices at Rochester and Glens Falls, Turbine will handle the complete Yeomans line of pumps for building, municipal, and industrial applications, and Yeomans systems of waste treatment for municipalities and industrial plants.

The headquarters of Rupp Equipment Co. in Buffalo, N.Y., is part of a plant where the old Pierce Arrow automobile was made. It covers several acres, has five railroad sidings.

Ex-Contractor Is Now the Biggest Distributor in Western New York

Some 18 years ago, Melvin Rupp started in business as a contractor in Buffalo, N. Y. A couple of air compressors and a truck saw him through his initial work, but 4 years later he decided to take on a few equipment accounts as a sideline. This was so profitable that in another 4 years he stopped contracting and went all out in the equipment supply field. Today, Rupp Equipment Co. is one of the largest distributors of road machinery in western New York.

Rupp's headquarters office and shop are at 101 Great Arrow Avenue in Buffalo, in part of a plant where the old Pierce Arrow automobile was made. His property there covers several acres and includes five railroad sidings. Ten offices are housed in a two-story building 50 x 25 feet; shop, parts, rental storage, and repair facilities are in a building 150 x 100 feet. The plant carries parts and equipment valued at $400,000.

Sixty-four miles away is the Rochester branch established in 1946 on 7 acres alongside the New York Central main line. The staff there operates from a 50 x 100 Quonset hut, but plans for a new building are in the air, and then the hut will be relegated to storage duty. Rochester carries $100,000 worth of parts and equipment.

At the Buffalo headquarters, Harold R. Alway is Manager assisting Mr. Rupp. Edmund T. Feist, Norman Brown, Carl R. Paepke, Ralph C. Smith, Timothy J. Sullivan, and James McCullough are Sales Representatives. Edward Montgomery is Shop Superintendent. Gerard Wehner is Manager of Parts and Rental. And Joe Shed is in charge of advertising.

Francis E. Benz, known to his colleagues as "Wimpy" because of his passion for hamburgers, is Manager of the Rochester branch. Carl E. Holthus assists him as Office Manager and Sales Representative. Dean C. Milliman superintends the shop. Arthur Munns is Parts Manager. Roy Then is Mechanic. And G. G. Hubbard is Sales Representative.

Distributes Gears, Gear Couplings

G. W. Bush Co., 601 Park Ave., West Hartford, Conn., is now exclusive New England distributor for the precision gears and flexible gear couplings made by Sier-Bath Gear & Pump Co., Inc., North Bergen, N. J. G. W. Bush Co. was formerly the Power Transmission Division of the Hartford Special Machinery Co. Gordon W. Bush, a power transmission specialist, became owner of the division in March, 1950.

New Carroll & Edwards Account

Asphalt-surface heaters and asphalt-road planers made by Asphalt Maintenance Co. of New York City are now being sold and serviced in southern Ohio by Carroll & Edwards, Cincinnati, Ohio, distributor.

Marion Dealers in West and Abroad

Rasmussen Equipment & Supply Co., 1960 South Second, W., Salt Lake City, has been appointed Marion Power Shovel Co. distributor for Utah, eastern Nevada, three counties in southern Idaho, and two counties in southwestern Wyoming. Marion is the thirteenth major equipment manufacturer now represented by Rasmussen.

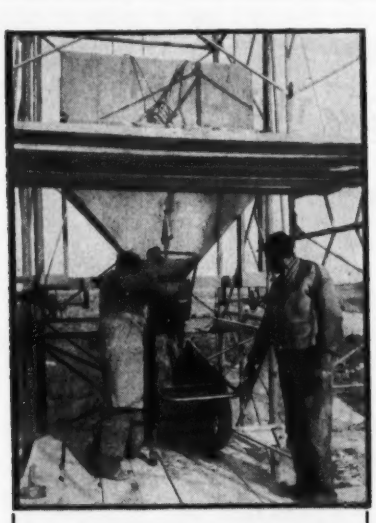
Sioux Machinery & Supply Co. at 315 W. Seventh, Sioux City, Iowa, is now handling Marion excavators in western Iowa and eastern Nebraska. C. W. Monroe is President and General Manager of the company, which was organized in 1944.

David E. Rizor, Assistant to the Vice President in Charge of Sales and Service, Marion Power Shovel Co., recently returned from a 17-week trip which took him to Marion export distributor firms and to field installations of Marion excavators around the world.

During his trip, Mr. Rizor appointed two new Marion export distributor companies. Commerciale et Miniere S. A., Rues Philhellenes Xenophon, in Athens, Greece; and Vulcan Agencies, P. O. Box 563, Haifa, Israel.

CE&S Handles Steam Cleaner

Contractors Equipment & Supply Co. was recently named a distributor for the Chem-Therm Mfg. Co., Pasadena, Calif., which makes the Chem-Therm steam cleaner. In addition to the cleaner, it will handle a complete line of replacement parts for the machine and Chem-Therm cleaning compounds. Offices are in El Paso, Texas, and Albuquerque, N. Mex.



JACKMANCO
CONCRETE CARTS HANDLE EASILY

Proven popular on the job by men who do the work . . .

Your men prefer to handle Jackmanco concrete carts because their work becomes easier.

This is accomplished through proper balance — taking as much of the load off the man as possible—and putting it on the cart, where it belongs. Another reason is the rocker dump feature. And still another is easy wheeling due to pencil roller bearings.

Your bookkeeper won't be bothered either, with maintenance repair bills. That's because Jackmanco products are quality built and give wonderful service for years.

Your supplier carries 'em. Ask him about his satisfied customers who specify JACKMANCO.

Superior Products since 1876

JACKMANCO
REG. U. S. PAT.

JACKSON MANUFACTURING CO.
HARRISBURG • PENNSYLVANIA

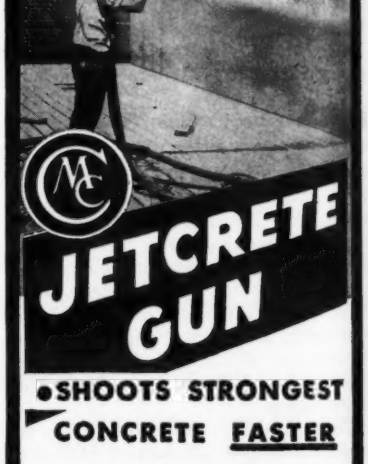
MR. ASPHALT PLANT OWNER

YOU TOO CAN SAVE FUEL
AND INCREASE PRODUCTION
BY USE OF
HOPKINS' VOLCANIC
LOW PRESSURE BURNING EQUIPMENT

WRITE FOR QUESTIONNAIRE AND DESCRIPTIVE FOLDER

Hopkins' Volcanic Specialties, Inc.
ALLIANCE, OHIO

MONEY MAKER



JETCRETE GUN

•SHOOTS STRONGEST CONCRETE FASTER

"Welding with Concrete" best describes the new CMC JETCRETE method of pneumatically applying concrete. JETCRETE is *the most nearly perfect concrete known today.* Wherever and whenever used, JETCRETE has done the job *better, faster—and at lower cost! The machine with a thousand uses!*

- ***BUILDING*** **. . . walls, roofs, partitions, fences, fire retards, etc.**
- ***REPAIRING*** **. . . Disintegration of all kinds—old buildings, bridges, stacks, bunkers, dams, etc.**
- ***WATERPROOFING*** **. . . Reservoirs, tunnels, tanks, drains, fissures, water basins, etc.**
- ***FIREPROOFING*** **. . . Wood, structural steel . . . buildings and mines, etc.**
- ***PRESERVING*** **. . . Brick, concrete, steel, tile, stucco, wood, iron, spillways, turbine chambers, piers, sewers, tunnels, etc.**

Write for illustrated bulletin No. SG-348 showing JETCRETE in action.

CONSTRUCTION MACHINERY COMPANIES
WATERLOO, IOWA

Convention Calendar

July 12-14—ASCE Summer Convention
Summer Convention, American Society of Civil Engineers, Toronto, Canada. Don P. Reynolds, Assistant to the Secretary, 33 W. 39th St., New York 18, N. Y.

November 12-30—Brazil Road Show
Road Show, Brazil National Highway Department and Associacao Rodoviaria do Brasil, Rio de Janeiro, Brazil. Ing. Jose Maria Carre, Delegado Executivo, Associacao Rodoviaria do Brasil, Caixa Postal 4351, Rio de Janeiro, Brazil.

Dec. 10-17—Pan American Highway Congress
Fifth Pan American Highway Congress, Lima, Peru. International Road Federation, 550 Washington Bldg., Washington 5, D. C.

Jan. 9-12, 1951—Highway Research Board
Annual Meeting, Highway Research Board of the National Research Council, National Academy of Sciences Bldg., Washington, D. C. Roy W. Crum, Director, 2101 Constitution Ave., Washington 25, D. C.

Florida Highway Conference

Approximately 300 highway engineers and officials attended the Fourth Annual Florida Highway Conference, held in Gainesville, Fla., May 11-12, under the sponsorship of the Department of Civil Engineering of the University of Florida.

S. P. Turnbull, State Highway Engineer, presided at the opening session. Dean Joseph Weil of the University's College of Engineering welcomed the group, and Wilfred Owen, economist of the Brookings Institution and author of the book "Automotive Transportation Trends and Problems", presented an authoritative discussion of the problems and implications of the national highway program. Alfred A. McKethan, Chairman of the State Road Department of Florida, discussed the state highway program and criticized the diversion of funds collected from motor-vehicle license fees to purposes other than highway expenditures.

Three separate technical sessions took up the afternoon. The first session dealt with the general subject of traffic engineering and planning; the second, with various aspects of the design and construction of low-cost streets and roads. Concrete design and construction was the topic of the third session.

On the morning of May 12, Charles Nelson, Personnel Engineer of the Virginia Department of Highways, discussed Virginia's graduate training program. A showing of a maintenance movie prepared by the Missouri Department of Highways prefaced a talk by E. C. DeGarmo of the Florida Road Department on the "Selection of Maintenance Equipment".

In the afternoon, A. W. Johnson of the Highway Research Board presented a paper on "Soil Compaction", and the conferees were shown the motion picture "Highway Soil Engineering" which was prepared by the Bureau of Public Roads.

Groups represented at the conference included the Florida State Road Department, Bureau of Public Roads, county and city officials and engineers, contractors, and materials and equipment people.

Clay-Products Warehouse

One-stop service was the goal when The Robinson Clay Product Co. built its new office, warehouse building, and yard on 180th St., Jamaica, Long Island, N. Y. Just as an example, all loading facilities in the warehouse and in the outside storage areas are on truck level to eliminate delays in supplying Robinson's clay products to building contractors in and around Greater New York. A. G. Holer is District Manager in the office and A. Brodel is Warehouse Superintendent.

Rebuilding to Mark 1950's

The 1950's will see the beginning of a great new era of rebuilding in this country. That is the prediction of James M. Ashley, President of the Producers' Council, national organization of building-products manufacturers.

More than 13,000,000 or about one-third of our housing supply is 40 years old or older, he says, and many of these houses will disappear in face of the competition presented by far more livable and desirable houses being built today. In the past, older homes have been removed from the national housing supply at an average rate of 40,000 units a year. That rate is certain to be stepped up sharply in the future.

A large number of our factories and store buildings, too, are completely obsolete, he adds—not only because of age but because new structures of modern design bring important savings in production and operating costs.

Catalog on Form System

An 8-page booklet describing and illustrating a new development in the Symons forming system is available from Symons Clamp & Mfg. Co., 4251 Diversey Ave., Chicago 39, Ill. The folder explains that now brace plates can be furnished for use on 2 x 4-inch braces and can later be used as horizontal supports on scaffolds. The horizontal support is connected to the vertical 2 x 4 by a scaffold clamp which eliminates nailing and saves lumber, the company says.

Another feature is a panel with steel cross members to take care of heavy pouring, especially when a vibrator is used.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 129.

New Office for Atlas Cement

The Universal Atlas Cement Co., U. S. Steel subsidiary, has rented the second and sixteenth floors of the new 36-story air-conditioned office building at 100 Park Ave., New York City, for its executive and general offices. The company's offices have been located in the Chrysler Building for the past twenty years.

HORSEPOWER
With A Pedigree
IND. 5
IND. 6
IND. 7
IND. 8
IND. 12
IND. 13
IND. 14
IND. 15
NOW 8 BASIC CHRYSLER ENGINES
FROM WHICH TO CHOOSE
In scores of industrial applications, Chrysler Industrial Engines are out-performing all other similarly rated engines. With less down time! With lower lifetime cost per hour. That comes from famed Chrysler engineering and high precision manufacturing. Yet thanks to Chrysler mass production economies, you can buy Chrysler power for less money!
If you use internal combustion power requiring 200 to 400 cubic inches piston displacement, get more for less! Phone your Chrysler Industrial Engine dealer or write us. Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.
CHRYSLER
Industrial Engines and Power Units
HORSEPOWER WITH A PEDIGREE

Burr Oak Dam Stores Water, Halts Floods

Earth Embankment Is Built, With Intake, Tunnel, and Spillway of Concrete, at Glouster, Ohio

✦ BURR Oak Dam on the East Branch of Sunday Creek, 3 miles north of Glouster, Ohio, is impounding a reservoir to supply that town with water, and to check floods in the Ohio River Valley. Located in Athens County, in southeastern Ohio, Burr Oak Reservoir is a project of the Corps of Engineers, U. S. Army, Huntington District.

Work on the earth dam, with its concrete spillway, intake structure, and intake tunnel, began in March, 1948, and was completed early this year at a cost of $2,250,000. The W. L. Johnson Co. of Columbus, Ohio, had the general contract on the dam. Ward Construction Service, Inc., of Charleston, W. Va., had the general contract on the intake tunnel and stilling basin—excavation and lining—and subcontracted and built the overflow spillway and intake structure for the dam.

The impervious earth dam averages 80 feet in height above the valley floor, and has a crest length of approximately 944 feet. The crest is 20 feet wide, while the average width through the base is 560 feet. Top elevation is 765.0. Side slopes vary from 2½ to 1, to 4½ to 1, with dumped-stone protection on the lower areas of the slopes. An inspection trench was first excavated along the center line of the dam to a depth of 10 feet; it has a bottom width of 10 feet from 1 on 2 side slopes.

About 1,000 feet south of the left abutment of the dam is the uncontrolled spillway, 665 feet in length, with a concrete weir measuring 80 feet between the walls. The side slopes of the spillway rock cut are lined for a portion of their length with reinforced-concrete walls 20 feet high and 1½ feet thick. The wall on one side is 240 feet long, and the wall on the other side is 204 feet long. They were built with two pours to a 25-foot monolith.

Tunnel

Through the rocky hillside of the left abutment is a tunnel, with an intake structure at the upstream end and a stilling basin at the downstream side. The water mains which tap the reservoir for the Glouster water supply run through the invert of the tunnel, which is 477 feet long and has an 8-foot-diameter horseshoe-shaped cross section, lined with reinforced concrete 1½ feet thick. It was excavated by boring an 11-foot-diameter hole through firm sandstone rock, 8 feet at a time, by the header and bench method. The only bracing required was a small amount of timber lagging.

Blast holes were drilled with jackhammers powered by air compressors, and the rock was mucked out by an Allis-Chalmers H-5 tractor with Hi-Lift, which backed out to the portal to load Athey wagons pulled by Caterpillar D8 tractors. The tunnel was worked from both ends, with the drill crew busy on one side while mucking was going on in the opposite end. Some of the excavation was placed on the dam slopes as dumped stone.

For the concrete lining an Erie Strayer portable concrete plant was set up on the side of a hill. The plant had a 3-compartment bin with a 20-yard capacity for the aggregate, and a ¾-yard mixer to handle 4-bag batches. Medusa bag cement was used. Sand was delivered by truck from the Stockport Sand & Gravel Co. of Stockport, Ohio, and gravel was supplied by the American Aggregates Corp. of Columbus, Ohio. The coarse aggregate was delivered partly by truck and partly by rail to a siding of the New York Central Railroad near Glouster. Carnegie Steel Co. furnished the reinforcing steel. Water for the mix was pumped from the creek.

In pouring the tunnel lining, the concrete was discharged from the mixer down a short chute into the hopper of a Rex 160-S Pumpcrete machine set up on a lower level. From there it was pumped through a pipe line and placed in Blaw-Knox steel collapsible forms in the tunnel. Concreting started at the middle and proceeded to both ends of the tunnel in 30-foot monoliths. One monolith section of the arch was completed each day, including erection of forms and placing of steel; the actual concrete-pouring time took from 4 to 5 hours.

The concrete was air-entrained, Vinsol resin being added at the mixer to make the average air content about 4½ per cent. Curing was done with Permite compound.

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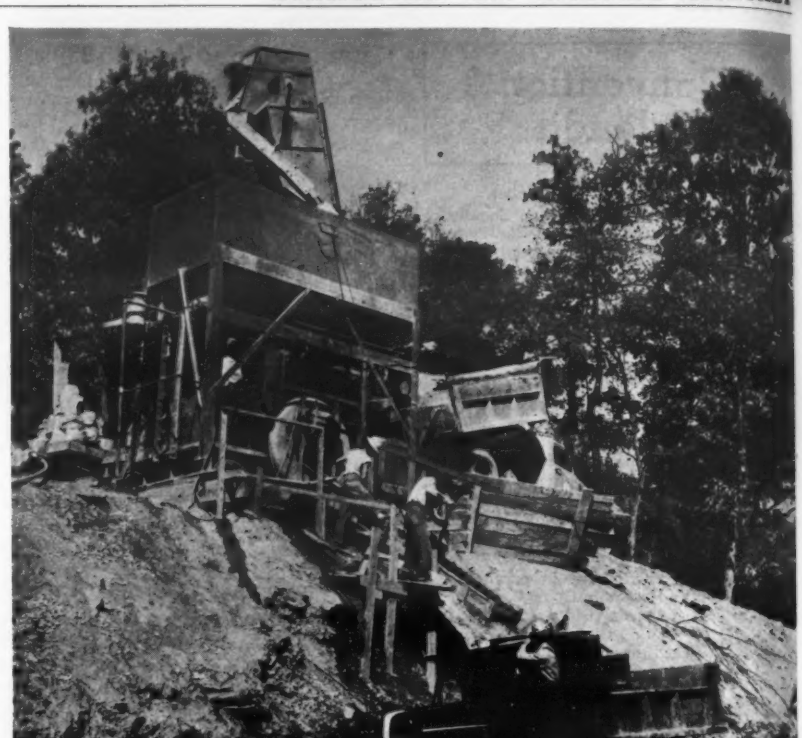


C. & E. M. Photo

An Erie Strayer portable plant perched on a hillside supplies concrete for Burr Oak Dam.

NEW!
HUSKY, WIDE and HANDSOME

TWO NEW MORRISON Carry-All ALL-STEEL, ALL-PURPOSE SERVICE BODIES

MORRISON "CARRY-ALL" MODEL B-910

The *"Carry-All"* can be easily and simply equipped to the needs of your own business. Optional *"Carry-All"* equipment includes the tailored caravan canvas top, sliding metal roof, overhead ladder racks, pipe racks, pipe vise bracket, material tray, compartment shelves. With these accessories, you can practically custom-design the standard *"Carry-All"* for your own particular requirements!

Write today for FREE LITERATURE on the MORRISON *"Carry-All"*, the new *"Carry-All"* TRAILETTE, *"Carry-All"* SIDE BOXES, and accessories.

MORRISON STEEL PRODUCTS, Inc.
Carry-All Body Division

643 AMHERST ST., BUFFALO 7, N. Y.

The Ninth of a Series in the interest of more efficient use of steel . . . a vital American resource

LACLEDE MULTI-RIB REINFORCING BARS

NOW . . . Available by Number in Standard Sizes of New A.S.T.M. Serial Designation A305-49 Table I

Thanks to A. S. T. M. specification A305-49, designers now have a more efficient bar for concrete reinforcement . . . one that provides **increased anchorage** which when properly used will give appreciable **savings in steel and concrete.** Advanced design Laclede Multi-Rib Reinforcing Bars exceed the A305-49 specification. They are available in uniform round sections in all standard sizes and can now be ordered by number.

TABLE I A.S.T.M. SERIAL DESIGNATION A305-49

Dimensional Requirements for Deformed Steel Bars for Concrete Reinforcement

		NOMINAL DIMENSIONS ROUND SECTIONS			REQUIREMENTS OF DEFORMATIONS		
Bar No.°	Unit Wt. Lbs./Ft.	Diameter-Inches Decimal	Cross Sectional Area Sq. Inches	Perimeter	Max. Avg. Spacing Inches	Min. Height Inches	Max. Gap. Inches ‡
3	0.376	.375	0.11	1.178	0.262	0.015	0.143
4	0.668	.500	0.20	1.571	0.350	0.020	0.191
5	1.043	.625	0.31	1.963	0.437	0.028	0.239
6	1.502	.750	0.44	2.356	0.525	0.038	0.286
7	2.044	.875	0.60	2.749	0.612	0.044	0.334
8	2.670	1.000	0.79	3.142	0.700	0.050	0.383
9*	3.400	1.128	1.00	3.544	0.790	0.056	0.431
10*	4.303	1.270	1.27	3.990	0.889	0.064	0.487
11*	5.313	1.410	1.56	4.430	0.987	0.071	0.540

*These sections have the same weight and area as bars formerly known as 1" Sq., 1⅛" Sq. and 1¼" Sq.

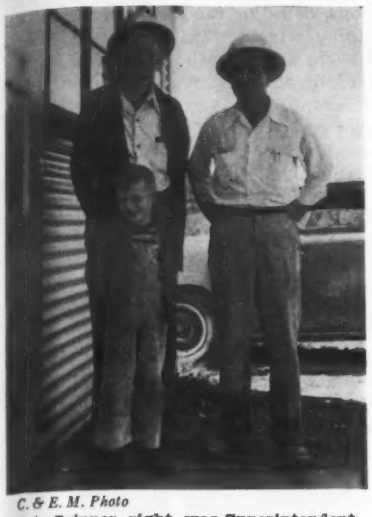
‡Chord of 12½% of Nom. Perimeter.

°Bar numbers are based on number of ⅛" included in the nominal diameter of the bar section.

— Write us —
About specifing LACLEDE MULTI-RIB BARS on your jobs

LACLEDE
Producers of Construction Steel

LACLEDE STEEL COMPANY
St. Louis, Mo.



C. & E. M. Photo
Pete Spinner, right, was Superintendent at Burr Oak Dam for Ward Construction Service, Inc. Monte R. McFarland was Resident Engineer for the Corps of Engineers. As for sonny there, Robert McFarland, he was assistant to Pop.

Earth Dam

With the tunnel under way, work also got started on the earth dam. The creek was diverted to the south-abutment side of the valley, the inspection trench was dug, and dirt was placed on the north side of the dam. Nearly all the material was taken from a hillside borrow pit that ran from sand to clay. It was located downstream from the dam, the average haul being 3,000 feet. A construction haul road crossed a railroad, highway, and a creek below the site.

Two 1-yard shovels—a Lorain 41 and a Koehring 301—were on the job for excavating and loading the 6 bottom-dump Euclids. These, along with 6 Super C Tournapulls snatch-loaded by a D8, handled the long hauls. Short hauls and leveling around the embankment were done by a pair of LeTourneau 16-yard Carryalls pulled by D8's. The material was placed in 9-inch lifts and spread by 6 dozers—2 D8's, 2 D7's, and 2 International TD-18's. Sheepsfoot rollers, making from 6 to 20 passes, compacted the lifts to an average job compaction of 100.3 per cent. Motor graders did the final shaping. Because of the moist nature of the borrow material water tanks were not needed.

When the tunnel was completed, the steam was diverted through it, thus enabling the contractor to work the full length of the embankment with fill operations. At the same time rock excavation continued in the spillway, with Ingersoll-Rand wagon drills making blast holes to bring the floor down to grade.

Spillway Side-Slope Lining

In pouring the 25-foot side-slope lining monoliths, form panels 26 feet long were built of 1 x 6 sheathing backed with 2 x 6 studs on 12-inch spacing, and double 2 x 6 wales on 2½-foot centers. Only a single form was used as the concrete was placed against the rock face of the spillway cut. The form was held in place with Richmond Tyscrus anchored to the walls on 2½-foot centers both ways. They were secured by drilling 1⅜-inch holes to a depth of 4 feet into the indurated clay sides. Then the Tyscrus, ½ inch x 4½ feet, were inserted, and the rest of the hole was backfilled with Embeco cement-mortar forced in under air pressure. This type of cement expands as it sets up, holding the rod, and the form, securely in place.

Concrete from the portable plant was chuted down the hill into Heltzel ¾-yard or 1-yard buckets, two of which were carried on a 5-ton dump truck. Two such truck units took care of the pours. The buckets were swung to the tops of the forms by either a Bay City or an Insley crane. As the concrete was placed in the 1½-foot walls, it was vibrated by Mall vibrators. The men placing the concrete worked from scaffolds built on top the forms. These were reached by ladders secured to the forms.

Quantities and Personnel

Besides being of use in checking floods and impounding water for municipal consumption, the Burr Oak Reservoir will provide a recreational area in that part of Ohio.

The major items in the construction contract for the dam itself included the following:

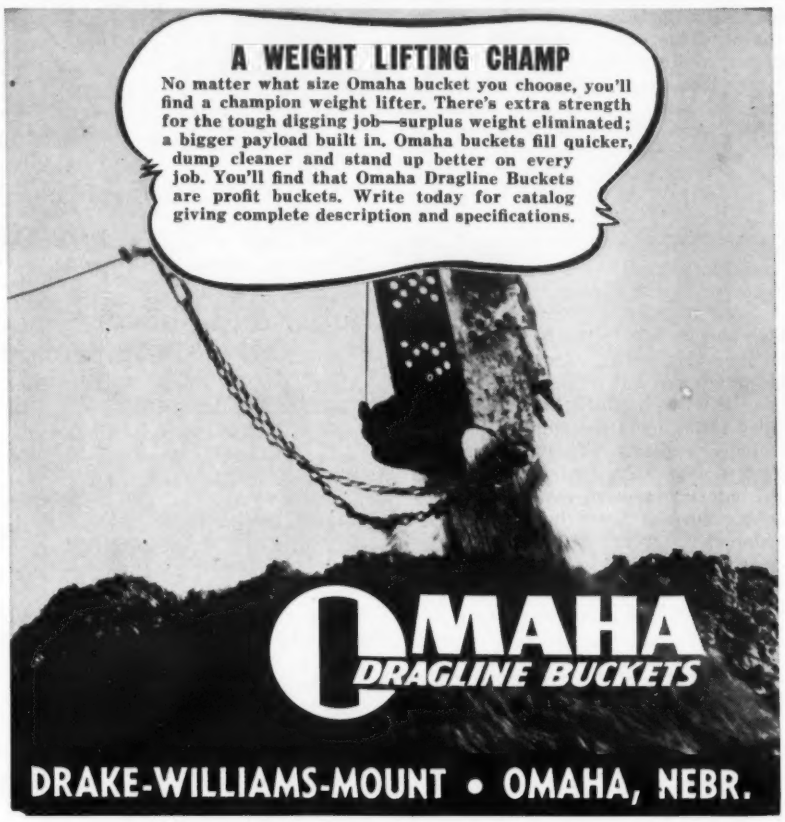
Excavation, common	48,800 cu. yds.
Excavation, borrow	550,000 cu. yds.
Excavation, rock	53,800 cu. yds.
Embankment	450,200 cu. yds.
Dumped stone	7,150 cu. yds.
Filter material	12,300 cu. yds.
Concrete	3,275 cu. yds.
Reinforcing steel	260,000 lbs.

A force averaging 100 men was engaged on the project. For the W. L. Johnson Co., Ralph Beerbower was Superintendent, while Pete Spinner was Superintendent for Ward Construction Service, Inc.

The Corps of Engineers, U. S. Army, was represented by Monte R. McFarland, Resident Engineer. The Huntington District, supervising the Burr Oak Reservoir construction, was headed at that time by Col. Alexander M. Neilson.

Chain Belt Midwest Mgr.

The Chain Belt Co. of Milwaukee announces the appointment of Robert R. Horton as Midwest District Manager for the Construction Machinery Division. He was previously its Midwest Sales Representative.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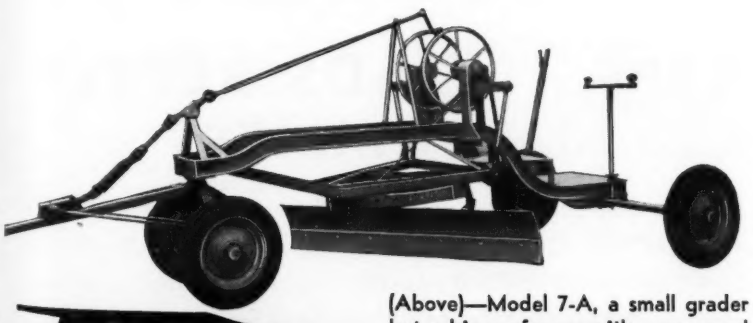
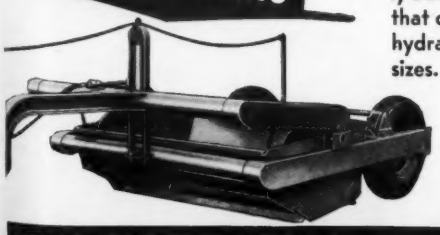


(Above)—Model 7-A, a small grader but a big performer with many good features. Also, the Model 80, heavier, better for high banks with its longer reach.

(Left)—A compactly designed, strongly built, reasonably priced earth mover that can be used with any tractor. Has hydraulic controls. In 1-yd. and 2-yd. sizes.



Send for complete specifications, folder No. 751

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THE MASTER OF ROAD BUILDING
When it comes to spraying Bituminous Materials on Roads, Streets, Highways or Runways, there's no unit that can operate at a lower cost than the Littleford "Spray Master" Pressure Distributor. This unit with either a Standard or a Full Vacuum Flow Circulating Bar up to 24 ft. in width can lay material on the Highway with 100% efficiency.
Then too, there are no gadgets to take a lot of the operator's time turning them off and on; with a "Spray Master"—one valve starts and stops the spray. "Spray Masters" are made in models up to 4000 gallons in size. Make your next Distributor the master of them all, the "Spray Master."
LB LITTLEFORD
LITTLEFORD BROS. INC.
485 E. Pearl St., Cincinnati 2, Ohio

Plates, Chains, Etc. Of Maganese Steel

A line of rolled and forged manganese-steel products, marketed under the trade name Rol-Man, is available from the Manganese Steel Forge Co., Richmond St. and Castor Ave., Philadelphia 34, Pa. These products include plates, bars, and special sections for equipment maintenance and welding repairs; digger-teeth points for shovel, bucket, or dragline; crusher hammers, grizzly bars, cage bars, and shafts for crushing and pulverizing machines; liners, wear plates, and blades for severe abrasive service; straight and offset-type link chains; bolts, pins, shafts, bushings, and other fabricated parts.

These products are designed for rugged service. Their wear and impact resistance is due in part to the 10 to 14 per cent manganese contained in the steel, and in part to the heat treatment they are given, which imparts strength and toughness but only medium hardness. Surface hardness is developed by forces acting upon the parts in use, the company explains. This feature also offers a renewable hard surface, for as the material is worn away each succeeding surface layer becomes work-hardened.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 158.

Masonry-Wall Protection

A new 4-page product data sheet available from the Industrial Products Division, The Flintkote Co., 30 Rockefeller Plaza, New York 20, N. Y., describes a spray-applied plastic adhesive seal coat and colored mineral granule application for weatherproofing and restoring masonry walls.

This coating system for exterior use, known as "Binderseal and Granules", consists of a spray coat of the specially compounded asphaltic material, followed by application of decorative granules which are embedded in the seal coat. Conventional spray equipment with compressor and drum head pump is used for the Binderseal application, and a small hopper with hose and nozzle has been designed to spray the granules.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 131.

Rust-Prevention Chart

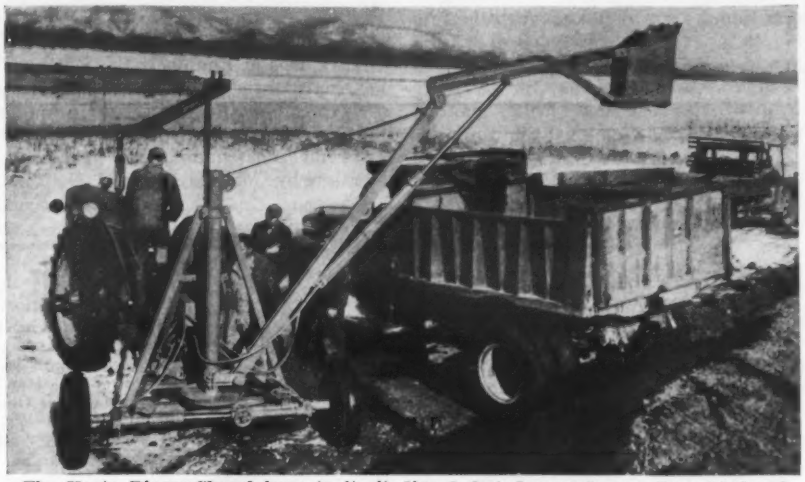
A broadside describing rust preventives is offered by the Nox-Rust Chemical Corp., 2483 S. Halsted St., Chicago 8, Ill. In chart form it indicates the applications for these products and the type of protection they offer, gives a physical description of them, and lists methods of applying and removing them. The broadside also indicates the Nox-Rust product designation for each preventive designed to meet a particular U. S. government specification.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 18.

Folder on Use of Decals

A 4-page folder featuring the use of decals in industry has been prepared by the Miracle Decal Co., 734 S. Washington, Wichita 9, Kans. It points out that the Miracle decals may be used for trade marks, operating instructions, product identification, name plates, dealers' signs, or ornamental uses. It explains that a wide variety of designs are being created by the company's staff artists, and that the finished product is made of an all-paint tough material that is easy to apply.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 78.



The Hopto Digger-Shovel hops to it—it digs 9 feet deep and uses three kinds of buckets, depending on the material and type of operation.

Digger and Shovel Unit Is Improved

An improved model of the Hopto Digger-Shovel, designed for easier operation, full 180-degree swing, and a variety of shovel equipment, has been announced by Badger Machine Co., 570-580 E. Front St., Winona, Minn. This trailer-type digger attaches to the power take-off of a tractor, Jeep, or truck, with the unit supplying the power acting as the counterweight.

Three controls actuate hydraulic cylinders which govern swing, boom, and dipper stick. Bucket widths from 14 to 24 inches are available in three types: the enclosed back-hoe for free-flowing materials; the skeleton type for sticky soils; and the shovel bucket for loading, material handling, and bank work. Buckets have reversible teeth cast of heat-treated alloy steel. The Hopto digs 9 feet deep and can be raised more than 14 feet above ground level for truck loading.

Further information may be secured from the company by requesting Bulletin No. 19502. Or use the Request Card at page 16. Circle No. 8.

Data on Motor-Oil Filters

A complete catalog on motor-oil filters and replacement cartridges for truck, tractor, marine, and stationary engines has been compiled by the Wix Accessories Corp., Gastonia, N. C. It tells how to select the correct replacement cartridge for all frequently encountered types of oil filters on construction machinery. It explains how to identify the filter and what Wix replacement cartridge to use. It also analyzes the construction features of Wix Micro-Pore engineered filtration, and lists Wix filter installations for cars, trucks, and tractors.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 117.

Pumps Provide Pressure Or Transfer of Any Fluid

Literature describing a variety of pumps for many applications in the construction industry is offered by the George D. Roper Corp., Blackhawk Ave., Rockford, Ill. The pumps can be used to create hydraulic pressure for control mechanisms or to transfer liquids.

The literature suggests their services for pressure lubrication, hydraulic controls, fuel supply, and transfer of viscous materials such as roofing compounds and petroleum asphalt for road paving. It explains that they can be used on hydraulic-control mechanisms for tractors, motor graders, snow plows, and other road machinery; for tank-to-truck transfer of asphalt; and on bituminous distributors and asphalt-heater pumping units.

The literature illustrates and describes each of the models, listing specifications, applications, and dimensions. One of the folders gives complete installing and operating instructions, detailing the location, foundation, piping, wiring, maintenance, and "trouble-chasing" methods. This 26-page bulletin also tells in simple language the different steps to follow in selecting the proper pump for a particular requirement. It includes much useful information and many technical tables.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 120.

Folders on Truck-Mixers

Two folders describing six truck-mixers with capacities ranging from 1¼ to 3 cubic yards have been prepared by the Concrete Transport Mixer Co., 4985 Fyler Ave., St. Louis 9, Mo. They provide complete specifications and detailed dimensioned drawings of the basic models. Field photographs illustrate the mixers on many kinds of jobs. Cutaway drawings show the mixing action of the machine. The Transport and Hi-Lo mixers provide fully visible mixing through their full open-top construction.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 123.

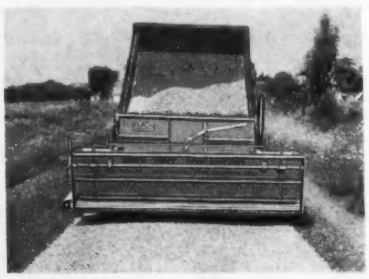
Diesel Program at Lancaster

The Lancaster Engineering Corp., at Lancaster, Pa., has established an Automotive Diesel Division which will specialize in the installation of "on-highway" diesel truck engines. A Brockway tractor equipped with a Buda diesel engine will be used for demonstration purposes. John J. Burkholder will head the new division at Lancaster; Fred Gardner will take charge at the company's Hazleton, Pa., branch; and Ned Beezer will head diesel sales in the Philipsburg, Pa., area. Service and installation will be handled by R. E. Griffith at Lancaster, Guy Stauffer at Hazleton, and Ken Urban at Philipsburg.

New Export Manager for A-C

Floyd J. Mischke is now Export Manager of the Tractor Division of the Allis-Chalmers Mfg. Co., Milwaukee, Wis. He succeeds the late M. J. Proud. Mr. Mischke has been with Allis-Chalmers since 1930 and with the Export Department since 1937. He has been Assistant Export Manager since 1948.

BURCH



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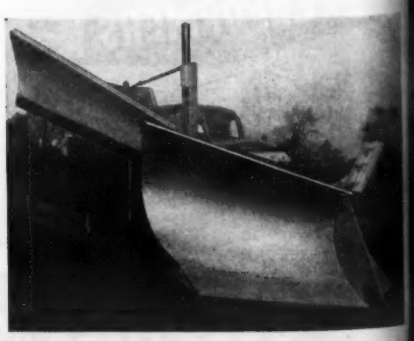
Uniform distribution is assured with this Burch force feed spreader due to its dual feed control—A Burch exclusive. All operating levers within easy reach of operator. Balances whether loaded or empty. Fits most any standard truck. Send for complete specifications.

KEEPS THEM OPEN IN WINTER •

Order your Burch-bilt ROSS snow plows now—be ready for winter! The time-tested "Sno-flo" mold boards plus superior construction features have earned high ratings for these popular plows. Send for Catalog "M".



ROSS SNOW PLOWS

THE BURCH CORPORATION

SINCE 1875 CRESTLINE, OHIO

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For large users of hose lines, this machine is reported to assemble hose 600 per cent faster than by hand.

Hose-Line Assembly With a New Machine

A new hose-assembly machine for large users of hose lines is offered by Aeroquip Corp. of Jackson, Mich., manufacturer of flexible hose lines with detachable fittings. While Aeroquip hose lines may be hand-assembled, the Model No. F-1766 machine enables large users to make up specific lengths of hose lines on short notice and 600 per cent faster than by hand assembly, the company says. It is claimed that any mechanic, after a brief indoctrination, can operate this machine at its maximum efficiency.

The machine accommodates all types of standard Aeroquip fittings, including male pipe, swivel, flange, and elbow type. This, the company points out, allows greater use of bulk hose and fittings, and reduces inventory of factory-assembled hose lines. The machine also permits quick salvage of large stocks of hose lines that cannot be used for one reason or another.

The machine rests on a cast-iron base, and is equipped with a speed selector, tool-steel mandrels, and interchangeable jaws. It may be mounted on any sturdy shop bench.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 64.

Pentachlorophenol Is Approved by the AWPA

An increased use of pentachlorophenol as a wood preservative was forecast by Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo., following the recent approval of penta by the American Wood Preservers' Association, as a standard oil-borne wood preservative.

Prior to this action, the only other oil-type preservatives which were recognized as standard by the AWPA were coal-tar creosote and creosote-coal-tar blends. The newly accepted preservative is a chemical which has controlled uniformity and a fixed preservative value, the company says.

Penta is versatile in application and has been included in many Federal, state, and industrial specifications covering the preservation of guardrails, bridge timbers, poles, cross arms, lumber, and millwork.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 34.

Trucks for Every Duty

A new series of catalogs describes the entire truck line manufactured by the International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. A separate catalog presents each series in line, which includes trucks with capacities ranging from 4,200 to 45,000 pounds gross vehicle weight.

The catalogs average 20 pages in length. They are fully illustrated with 4-color photographs and indicate all construction and operating features of the trucks, their specifications, applications, and variations in design. Cutaway drawings and photographs point out each mechanical feature.

This literature may be obtained from the company, or by using the Request Card at page 16 and indicating the gross-vehicle-weight range you are interested in. Circle No. 43.

New Electrode Holder

A new insulated electrode holder has been introduced by the Lincoln Electric Co., P. O. Box 5758, Cleveland 1, Ohio. It is designed to combine the features of both tong and hole-type holders in providing a strong lock-jaw electrode grip with easy thumb-pressure electrode release. Its small size is said to simplify operation with heavy gloves and in corners and other confined areas.

The tip of the jaw end of the LJ-1 holder is covered with a high-temperature-resistant asbestos-base compound which is highly flexible. The tip cannot be broken by the impact or shock of dropping or crushing, Lincoln says. Weld spatter will not adhere to it. The handle and jaw lever arm are also completely insulated with a tough high-temperature fiber. The metal frame of the holder is a high-strength electrical bronze.

The cam jaw, open to one side of the holder, gives one position 20 degrees off the vertical for downhand welding, and a second position 30 degrees off the horizontal for overhead welding. A hole is provided in the jaw for holding 18-inch center-grip electrodes. The Lincoln LJ-1 is manufactured in the 250-amp size for 1/16 to 3/16-inch electrodes.

Further information may be obtained from the company. Or use the Request Card at page 16. Circle No. 65.

Low-Stretch V-Belts

A new line of V-belts incorporating a chemically produced fiber designed for high strength, low stretch, and shock absorption has been developed by the Goodyear Tire & Rubber Co., Akron 16, Ohio.

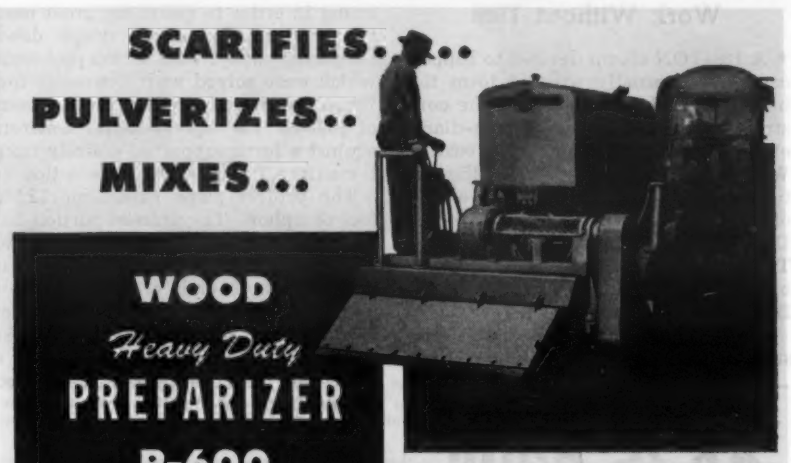
The strength of the new fiber used for the first time in the HY-T belts enables them to handle 40 per cent more horsepower than standard multi-V-belts without excessive stretch, the company claims. The new synthetic cord is said to resist water and mildew. Its inherent resistance to shrinking gives the belt length stability.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 19.

Concrete Vibrators, Floats

An 8-page folder describing a line of concrete form vibrators, mass vibrators, and concrete floats has been prepared by the Syntron Co., 227 Lexington, Homer City, Pa. It illustrates and describes electro-magnetic vibrating floats, both long-handle and hand types; Models V-55 and V-75 concrete form vibrators with vise clamps; and Syntron flexible-shaft electric and gasoline-powered concrete vibrators.

This literature may be secured from the company. Or use the Request Card at page 16. Circle No. 104.



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Easy to set up, align and brace—3" to 24" I. D.

Will not "ride up" when concrete is poured in. Concrete can be poured direct from mixer or from bucket, as illustrated.

SONOTUBES can be left on or easily stripped off. Reinforcing beams or braces can be set in before pouring or placed in position after pouring.

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If so—look to Electroline Wire Rope Fittings! These permanent wire rope fittings prolong the life of wire rope by damping vibration stresses and overcoming rope fatigue at entrance to fittings—Electroline Fittings Definitely Minimize Re-Roping!

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Special Forms Mold Steel-Lined Siphon

Concrete for the Big Barrel Is Placed Against a Special Steel Form Heavy Enough to Work Without Ties

✦ A 120-TON clamp devised to support concrete externally without form ties has been used successfully in the construction of the 22-foot-4-inch-diameter Soap Lake Siphon in eastern Washington. Construction of the big tube across the coulee floor is a part of the Columbia Basin Project of the United States Bureau of Reclamation. The $7,614,000 siphon contract was held by the joint-venture firms of Winston Bros. Co. and Utah Construction Co.

When the two firms schemed a construction plan for the siphon, their engineers faced a problem which to them was difficult and without precedent. Approximately 8,250 feet of the siphon had to be built with a steel shell lining in order to resist the great head pressure as the water drops down across the valley. Most of the problems, which were solved with amazingly few "bugs", centered around the business of placing the siphon-barrel concrete against a form supported entirely from the external side, without form ties.

The project plans called for 12,882 feet of siphon. The unlined portion has 24-inch reinforced-concrete walls and is 25 feet in inside diameter. It is located at both ends of the lined section, which has an inside diameter of 22 feet 4 inches and consists of 20¾-inch reinforced-concrete walls with a steel liner of ¼-inch plate fabricated at the site.

Close Organization Needed

The project was scarcely more than 2 miles long, and within that distance was centered an organization as unusual as some of the construction schemes. Much of the construction was done by the prime contractors, but many of the specialty items, such as the fabrication and placement of steel liner sections, steel reinforcement, and so on, were subbed to specialty contractors. The coordination and organization of activity on the part of all concerned was a precise and intricate piece of timing.

Operations centered around the construction of 40 feet of lined siphon, 25 feet of unlined siphon, and the attendant items of excavation and cushion backfill, each day. The steady production rate on the lined section was perhaps the touchier problem, since so many different activities were represented in a single day's construction there.

To attain that result, the work of the prime contractor and five subcontractors had to be integrated within very close limits. The subcontract for fabrication of steel liner pipe was held by American Pipe & Construction Co. Welding each section together was done by Humiston-Rosendahl, Inc., operating jointly with Bigge Drayage Co., a rigging firm which hauled and placed the pipe liner sections within the excavated area. D. V. Libby had the subcontract to fabricate and place some 26,000,000 pounds of steel reinforcement, half of which was made up of 2-inch square steel bars. Bratton-Griffin hauled the aggregate and dry concrete batches from the batching plant to the mixers at Soap Lake. Walter Ferem Co. will clean and enamel the inside of the steel pipe liner.

Excavation

Extensive excavation work was necessary to gouge a trench through the hard sun-baked crust of the earth. Some 240,000 cubic yards of common and 226,000 yards of rock excavation were necessary to carve out the ditch in which the big pipe was to be placed.

Initial stripping was handled by a Bucyrus-Erie 54-B dragline equipped with a 3-yard bucket. The overburden was cast to one side, and the 54-B machine roughed in the excavation to the point where rock began to appear. Drilling and blasting crews then took over.

Eight Ingersoll-Rand wagon drills with Carset bits and I-R steel with a maximum length of 35 feet were used. Compressed air was furnished by one 1,600 and one 1,100-cfm Fuller stationary compressor, set up in a permanent Quonset-type shed. The air was then delivered to the drills by 6-inch invasion pipe headers.

Rock is an igneous formation, mostly basalt. It is seamed and cracked by the rapid cooling it underwent ages ago. It is not easy to drill or shoot, and constant changes of drill-hole centers to coincide with geological characteristics are required. Excessive use of explosives marked much of the early work, but later on, after experience had taught the powder crews how the basalt reacted, the blasting ratio was reduced. The use of a few Ingersoll-Rand Jackhamers with short steel and Jackbits in the shallow spots also helped to break up the rock ahead of excavation.

(*Continued on pages* 83 *and* 84)

do 4 days' work in 3 with JAEGER pressure

125 ft. of 100 lb. air —Runs 2 heavy breakers or a heavy duty rock drill at full pressure.

15% to 20% more air @ 100 lbs. does 30% to 40% more work

It is important to you that, at full pressure, air tools hit enough harder and faster to do 30% to 40% more work than they do at the 70 lbs. pressure maintained by undersized compressors.

Jaeger "new standard" ratings (the first increase in the industry since 1932) give you the air you must have to run today's tools at proper pressure and efficiency—75 ft. of 100 lb. air instead of 60—125 ft. instead of 105—185 ft. instead of 160—250 ft. instead of 210—365 ft. instead of 315—600 ft. instead of 500. If this cost-saving interests you, send for Jaeger Catalog JC-8.

600 ft. of 100 lb. air — Runs 2 big wagon drills at full pressure, drilling 30% to 40% more footage than you can get with any 500 ft. compressor.

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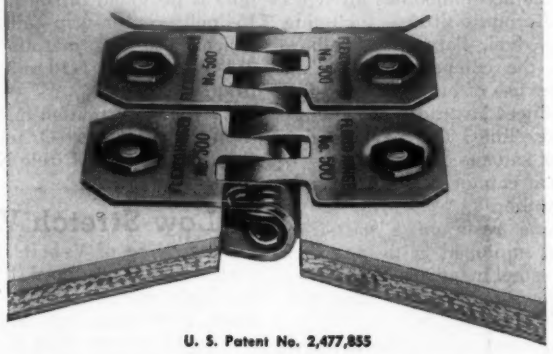
FLEXCO HINGED BELT FASTENERS



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- A FLEXCO fastener that is HINGED. Has removable hinge pin.
- Troughs naturally, operates through take-up pulleys.
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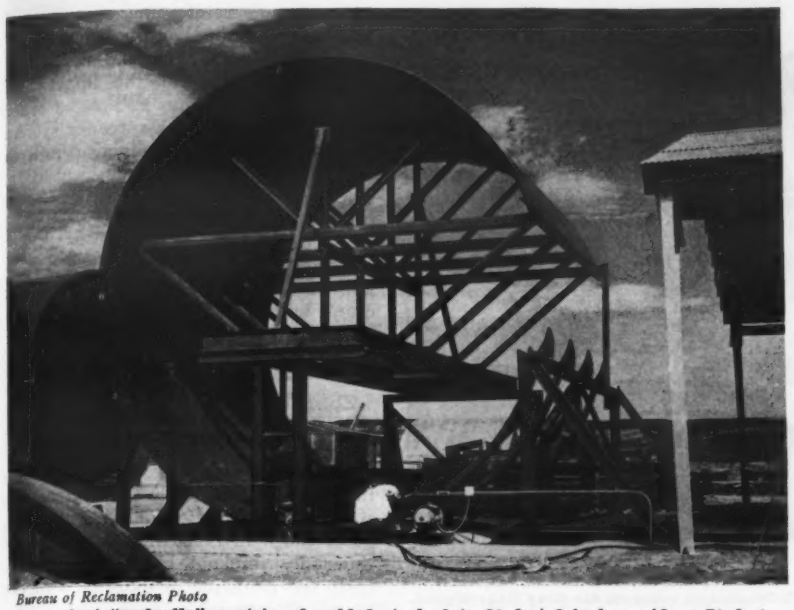
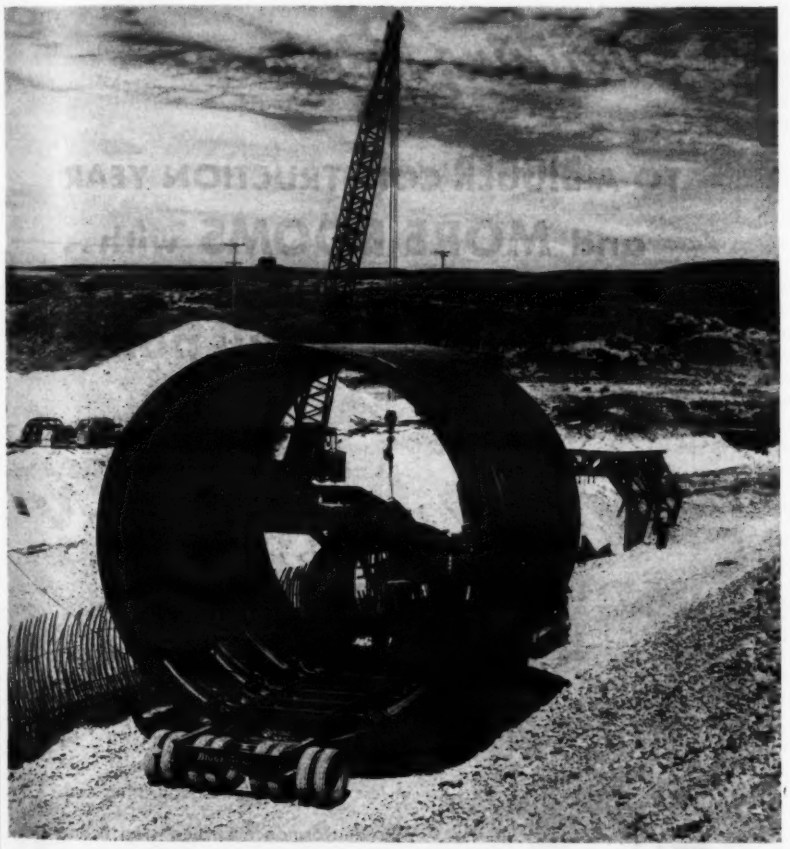


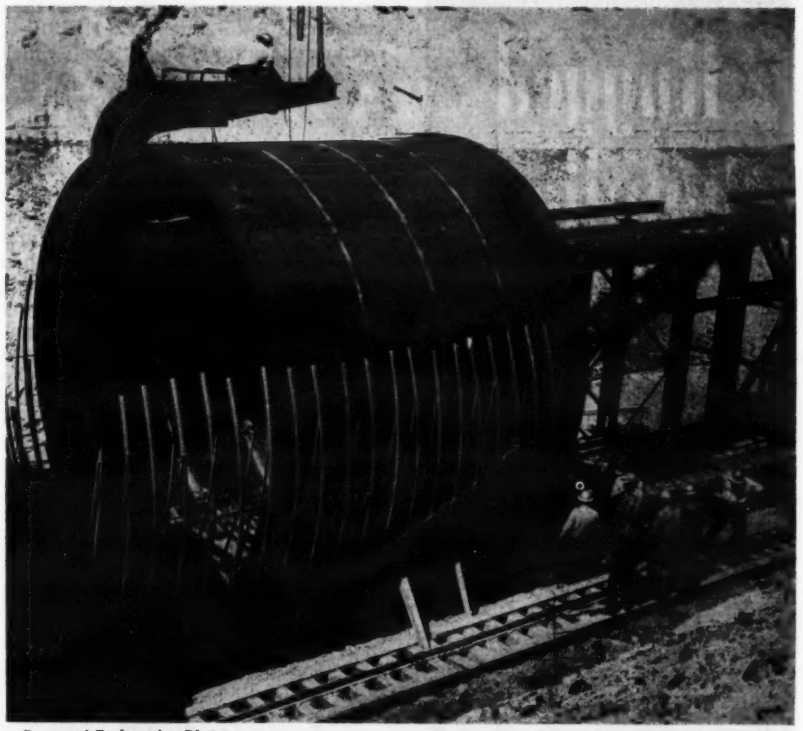
Bureau of Reclamation Photo

On a giant "umbrella", a strip of welded steel plate 20 feet 2 inches wide x 70 feet 3 inches long, is rolled into a circular shape to form a lining pipe for the Bureau of Reclamation's Soap Lake Siphon, on the Columbia Basin Project in eastern Washington.

Bureau of Reclamation Photo

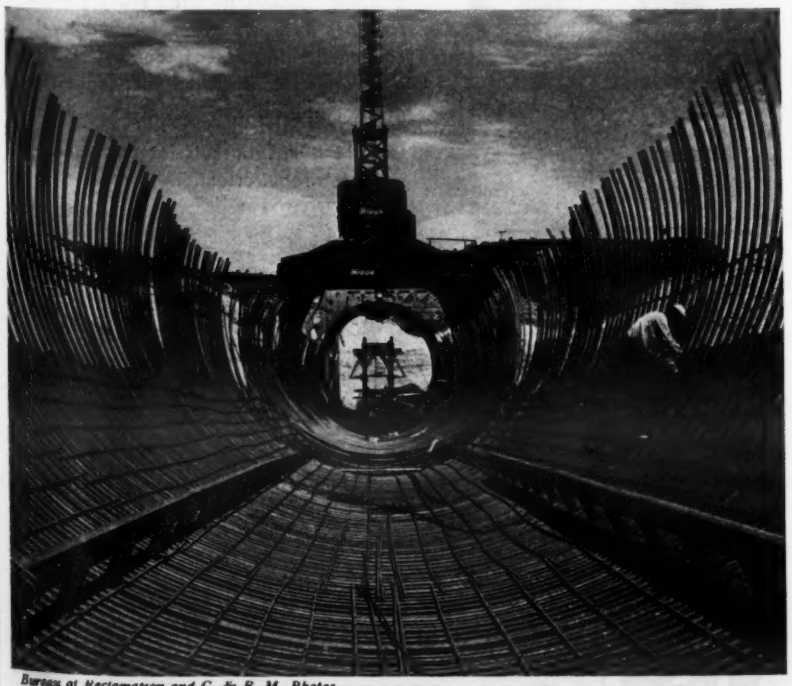
Here a contraction joint in the liner has its "rolled angle" welded on. The section rests on two power rolls which rotate it. In the middle distance is the jig where stiffener rings are installed and the closing seam is welded; behind that is the "umbrella".





Bureau of Reclamation Photos

At left, a liner section is transported from the American Pipe & Construction Co. fabricating yard to the siphon site by Bigge Drayage Co. on a 20-ton K-14 Kenworth. Above, a "hairpin" locates the section in the framework of steel. Notice the two jigs which are necessary in replacing the light stiffener rings used in fabricating the pipe with heavier stiffener rings required when concrete is being placed.



Bureau of Reclamation and C. & E. M. Photos

Here's a longitudinal view of the siphon job, showing the outer curtain of reinforcing steel, the inner curtain, support staubs, channel iron, the gantry for placing the liner pipe, a section of liner, and the jigs for replacing stiffener rings. From farther away, in the photo at right, we see the concrete crew placing the base for the siphon. Utah Construction Co. and Winston Bros. Co. were joint-venture contractors on the job.

Special Forms Mold Steel-Lined Siphon

(*Continued from page 82*)

Main excavation was handled by a Marion 4161 electric dragline with a 6-yard bucket. This machine dealt with everything from broken rock down to common excavation in heavy banks. The material was cast aside, for possible use later on to backfill against the tube. The Marion machine did not do final trimming, and its operator moved the rig ahead just as soon as it approached final grade and full buckets were no longer feasible.

Final trimming was done by a Northwest 80-D dragline, assisted by a D6 Caterpillar-mounted bulldozer working in the bottom of the excavation.

Excavation Lined Ahead

A select course of cushion material, placed under the siphon barrel, followed immediately behind excavation. Composed of a fine sandy clay, the material was dug from local pits and trucked in. It was dumped on top of the bank over the trench. It was then transferred to the ditch by a clamshell-equipped Lorain Moto-Crane, which spread the material to depths ranging from 6 to 12 inches. A 10-inch average thickness was maintained.

C. & E. M. Photo

A Maxon Dumpcrete fills a transfer bucket with foundation concrete for Soap Lake Siphon.

Four pneumatic tampers then compacted the cushion material to 95 per cent standard density, after which a fine-grading crew topped off the blanket by hand. Concrete pedestals and a 2-inch concrete blanket were then placed as a base for the siphon steel. The concrete blanket was placed by the contractors at their expense, over and above the requirements of the USBR specifications, to preserve the true slope and eliminate the need for costly clean-up work after the reinforcing steel was placed.

Concrete for the pedestals and blanket was proportioned from the central batching plant, mixed by a Ransome 34-E dual-drum paver, and hauled by four Dumpcrete bodies on Ford trucks. It was transferred to the pour by a Gar-Bro bucket on the Lorain Moto-Crane. An upright piece of 4 x 4 x ⅜-inch angle steel was placed in the center of each pedestal, extending approximately 12 inches in the clear.

Reinforcing Steel Placed

Reinforcing steel was started on each of the pours by first placing a 1-inch rod along the angle steel, in order to support the lower outside curtain of reinforcing. Then a 9-inch channel iron was placed flush with the top of the steel angles. This supported the lower inside curtain of steel and the large 22-foot shell liner. Spot welds fastened both the channel steel and the 1-inch rod. The inside curtain of reinforcing steel lies flush against the steel liner plate.

The gang then finished setting the lower inside reinforcing curtain, and a gantry-mounted crane owned by Bigge Drayage Co. set the steel liner. Reinforcing steel for the upper half was then finished out in inverse order of the bottom half. A spreader system of welded steel bars was also built to hold the upper outside bars in position. The lap ends of the 2-inch bars were often hard to join, for they overlapped by 40 diameters.

The steel reinforcing is extremely heavy. A Link-Belt Speeder truck crane with a 70-foot boom swung the bars down to placing position.

Special Forms Used

Special steel forms rolled into position as soon as the placement of reinforcing steel had been completed for a given pour. Weighing about 120 tons, the forms were built to the contractor's specifications by Consolidated Western Steel Corp. in Los Angeles. They are especially unusual because they embody the principle of external support

(*Continued on next page*)

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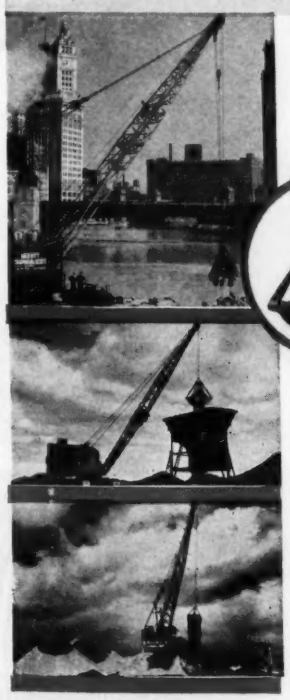

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entirely, without the usual form ties.

The forms consist of a heavy outer C-clamp and an arrangement of hydraulic jacks. The steel liner plate forms the inside of the tube. The forms are 20 feet long, and with two of these sections on the job, they could be used either as 20 or 40-foot set-ups. The two 20-foot sections, when used on curves, were made out at the center with gores, which gave a faster set-up and a truer curve. The front end was always set up square with the siphon tube.

Each section of the forms rode on special trucks, with two wheels at each corner. Steel railroad rails, laid out ahead, carried the load. Each section had 8 heavy hydraulic jacks which permitted rapid and true adjustment. There were also several stulls to transfer the weight of the form to the steel liner, in order to counteract the uplifting action of fresh concrete.

Twelve external Viber vibrators, fastened on the forms, permitted vibration at any given point as desired. The hydraulic jacking system operated from a central control panel. There was a 60-degree opening at the top of the forms, and four sets of downspouts on each side fed the concrete in to the pour from cover plates in the sides.

When the forms were designed, some perplexing problems were solved permanently. Weight was the principal thing. Despite every calculation, the weight was still too little to hold the heavy pressure of concrete. Engineers piled in more and more metal until they were sure the heavy C-clamp would hold. It was also very tough to work out enough clearance so that men could get in to clean and oil the steel sides before the forms were set.

The forms were so efficiently designed and built that it required only 2 hours to loosen and move them ahead on a straightaway, and 4 hours on a curve. When the jacks pulled the forms loose, they were moved ahead by steel cables attached to an air winch on each side of the contrivance.

Inside Work Precedes Pour

Extensive work was of course necessary on the inside of each shell liner before the fragile steel would stand up under the weight of concrete. First of all, heavy H-beam inner braces were placed. Arranged in sections, the steel ribs were carried ahead on special jumbos which rode on a narrow-gage railroad track. The ribs were hinged near the top, and were adjusted by means of jacks. When the ribs were in place and adjusted, the inside of the shell was supported perfectly by a rigid framework of 10-inch H-beams which could not give under the enormous stress imposed by the weight of concrete.

Special welding jumbos also rode along on the same narrow-gage railroad track. The field weld which joined the butt ends of the steel liners was made with Lincoln equipment on each jumbo. Welding was done during the daylight hours, and the jumbos were removed about 3:30 p. m. each day by the gantry-mounted crane which set the steel liner. This left the way clear for the removal and replacement of the H-beam inner braces.

Dumpcretes Haul Concrete

Concrete was proportioned by an automatic batch plant and mixed by a 34-E Ransome dual-drum paver. An air-entraining agent was added at the paver to put about 4 per cent of entrained air in the mix. The fresh concrete was then dumped to four 4-yard Dumpcrete bodies on Ford trucks, for transportation to the job.

The Dumpcretes stopped on a haul road along the siphon and dumped their loads gradually into a receiving hopper. A 30-inch conveyor belt carried the concrete up an incline to the deck hopper on top of the massive siphon form. Workmen with Gar-Bro concrete buggies took the concrete from the deck hopper and wheeled it to the downspouts. Five buggies were used.

A special system of signal lights operated by the men down in the forms told the men on top exactly where concrete was required. As the pour rose, the man who moved the boil pots from door to door pressed a button which in turn snapped on a red light on top of the platform. The buggy men therefore could see at a glance which hoppers needed concrete at any given time.

Placement was made by carrying the concrete slightly higher on one side until the invert section was sealed off. This had a tendency to get rid of air pockets and insure a tight fit of the concrete up against the bottom of the steel liner. In addition to the external vibrators, several Chicago Pneumatic 219's were used internally. In order to make certain that the concrete filled solidly against the pipe, inspectors tapped inside the liner with small hammers. The least void was clearly evident at once. The section directly under the pipe liner was vulnerable to voids, and great care was used to guard against them.

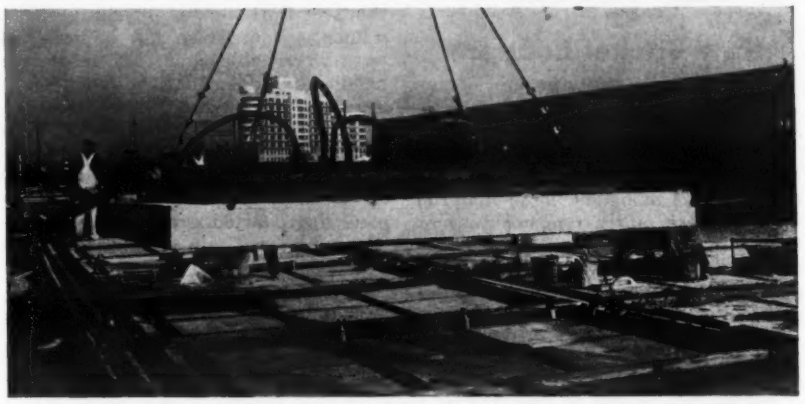
All concrete on the project was cured with Hunt Process white-pigmented solution.

Concrete placement on the lined sections was closely controlled as to time. The carpenter crew which moved the form came to work at 4 a. m. and finished setting the form by about 12:30 p. m. It did not take them this long by any means, but clean-up, checking, and miscellaneous other activities of that nature required time.

While the carpenters were working in the morning, the concrete crew was busy placing a 25-foot section of the unlined siphon which had been made ready the day before by another carpenter gang. The forms for this work were steel, and also rode on a railroad track. By alternating on two 25-foot forms, there was always work every day on that part of the job.

Concrete placing on an unlined section, which usually began at 9 a. m., finished off about 12:30 p. m. The concrete crew then ate lunch and started on the lined section about 1 p. m. This

(*Concluded on next page, Col. 2*)



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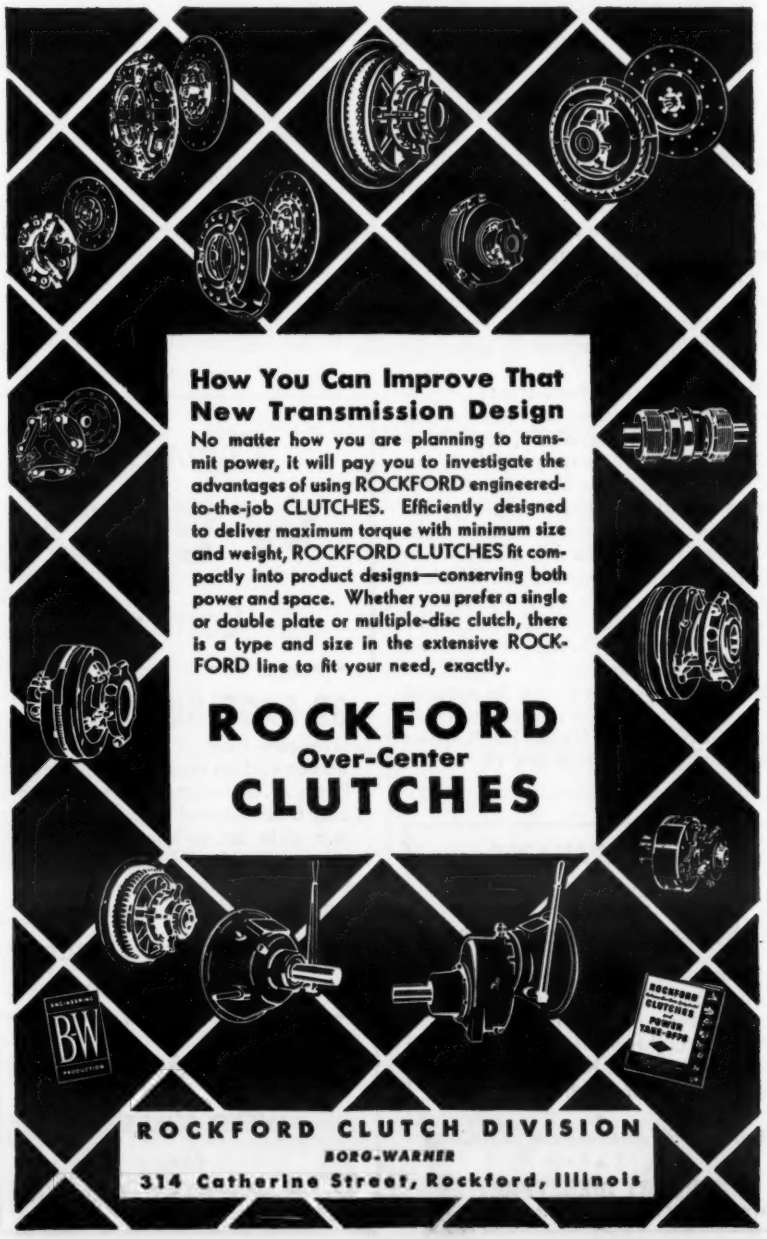
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This is Nelson's P-11 bucket loader. Another new model, called the Q-11, is mounted on crawlers.

New Bucket Loaders

Two new heavy-duty bucket loaders are now being produced by N. P. Nelson Iron Works, Inc., of Clifton, N. J. The Model P-11 is mounted on wheels; the Model Q-11 is on crawlers. Both are designed to handle loose material up to 3 inches, either from stockpiles or bank-run sand and gravel pits. Their rated loading capacity is 3 to 4 yards per minute, with a maximum weight of material of 150 pounds per cubic foot.

The new Nelson's feature hydraulic boom control; Timken-bearing elevator; 3-point-mounted spiral-feed shaft; wear-resistant manganese-steel bucket chains, sprockets, bucket edges, and spiral feeder edges; and Twin-Disc clutches with double-roller-chain transmission drive. The hoist has dual double-acting cylinders. The two-in-one transmission and differential is encased in a single oil-filled housing. The swivel spout is designed to reach a height to fill the largest trucks. A steel canopy protects the operator.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 89.

A New Snatch Block

A new snatch block designed for simplified, safe performance has been developed by LeBus Rotary Tool Works, Inc., Box 2352, Longview, Texas. Its new lock-pin design eliminates the use of tools, the company says, and bronze hub caps on the sheaves do away with any sparking dangers around gas or oil. The sheaves are so designed that wire or manila rope may be used.

The blocks are of heat-treated drop-forged steel, precision-machined. They are available in 4½, 5¾, 6, 8, and 10-inch sizes. The company points out that the wire line can be inserted in the sheave by turning the lock pin to the right, then pushing the pin through the slot which releases the side plate. When this procedure is reversed, the block is ready for use. This may be accomplished, without the use of tools, while the block is hanging in the derrick or on top of a gin pole.

Further information may be secured from the company by requesting catalog sheet No. 1000. Or use the Request Card at page 16. Circle No. 79.

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Special Forms Mold Steel-Lined Siphon

(Continued from preceding page)

crew placed as high as 200 cubic yards in 3 hours, and a steady rate of 50 yards an hour was routine. The afternoon pour was usually finished in plenty of time so that little overtime work was necessary.

Liners Fabricated on Job

An extremely efficient liner-fabricating yard was set up by American Pipe & Construction Co. for the manufacture of steel liner shells. The steel sheets, 70 feet 3 inches x 20 feet 2 inches, arrived in bulk from the American shops in Portland. Eight sheets made a liner section. They were laid out flat on a work table, and each sheet was handled by a small hand hoist on a monorail. The work table was fitted with ball-bearing rollers so the sheets could be manipulated with ease. A Union-Melt automatic welder fastened the sheets together, and the long, flat plate then started over a power roller which turned it into a liner shell. The belled end was also made at this time by having one end of the rolls beveled.

Held by clamps, and supported internally by two spiders, the pipe was transferred to another jig by a Lima crane. Welders then made the closing weld which turned the liner into a solid piece. Special lifting tools made pipe handling easy. Two liner sections were completed each day and sent out to the job early each morning. After they were set in place, and heavier spiders placed as required in concreting, the original and lighter spiders were brought back to the American yard. The heavier spiders were not removed until the concrete had a strength of 1,300 psi.

All in all, the project moved ahead on schedule with clocklike regularity, thanks to good organization and cooperation between the several subcontractors, the prime contractors, and the Bureau of Reclamation.

Personnel

For the Bureau of Reclamation, the general direction was by L. N. McClellan, Chief Engineer, with offices at Denver. Local Bureau personnel included F. A. Banks, District Manager; Supervising Engineer H. A. Parker; F. S. Arnold, Construction Engineer; Resident Engineer Harold M. Sheerer; and Vern R. Votaw, Field Engineer.

For Winston-Utah, G. M. Mann was Project Manager, F. G. Peterson was Construction Manager, and Hugh S. Thompson was General Superintendent. R. L. Wahl was Office Manager, Pier Wambold was Siphon Superintendent, and Roy Schriner was Master Mechanic.

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Hovde Chairman of BRAB

Dr. Frederick L. Hovde, President of Purdue University, has accepted the chairmanship of the Building Research Advisory Board. His appointment fills the vacancy resulting from the death of Dr. Frank B. Jewett.

Dr. Hovde served in a number of positions for the wartime research organizations of the Office of Scientific Research and Development, and the National Defense Research Committee. Since the war he has been active in directing post-war defense research programs on guided missiles and undersea-warfare weapons systems.

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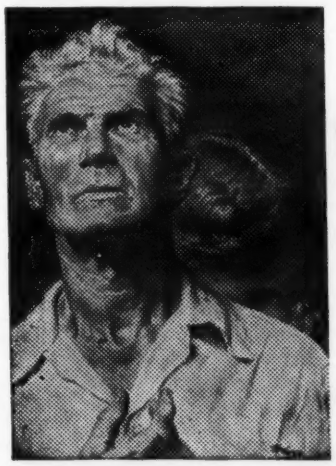
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YOUR dollars can mean the difference between life and death. Can **YOU** afford not to help?

Rehandling Conveyors

Two new portable conveyors for material rehandling have recently been announced by The Fairfield Engineering Co., of Marion, Ohio.

The 20-foot Model 265 reloader weighs 1,200 pounds complete with motor. Features include all-welded construction, wrap drive, automatic drag-chain take-ups, replaceable-foot end sections, and a self-locking worm-type boom hoist. The Model 266 is a dual-purpose unit; rendering the same yard service as the 265, it can also be towed to delivery sites for loading and stock-piling duties.

The units are available in 14, 17, 20, and 25-foot lengths. The trough is 16 inches wide x 6½ inches deep. Powered by 3-hp electric motors or 4½ to 8-hp gasoline engines, the conveyors are said to deliver 40 tons per hour.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 62.

New Anti-Rust Fuel

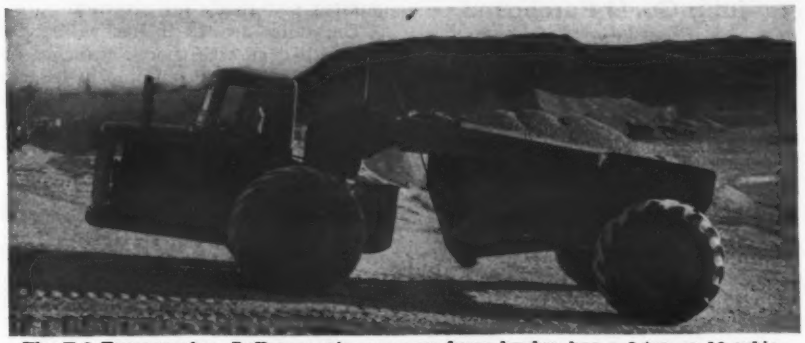
RD-119, a new product developed by the Sinclair Research Department, is designed to solve the problem of rust in gasoline tanks and fuel systems. The anti-rust chemical, blended into fuels, coats the gas tanks and fuel system with an invisible waterproof film that stops rust and corrosion, says Sinclair. By inhibiting corrosive elements, the new fuel provides economy in operation and lowers maintenance and replacement costs for carburetors and fuel pumps, the company says.

Further information may be secured from the Sinclair Refining Co., 630 Fifth Ave., New York 20, N. Y. Or use the Request Card at page 16. Circle No. 124.

Folder on Motor Grader

A 4-page folder describing the American No. 6 motor grader has been put out by the American-Coleman Co., Omaha, Nebr. This machine may be used for maintaining streets, roads, airports, and parkways; cutting and cleaning ditches; scarifying; bulldozing all types of materials; loading snow, sand, and gravel; and snow plowing. The folder tells about construction and operating features of the No. 6.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 105.



The E-9 Tournarocker, LeTourneau's new rear-dump hauler, has a 9-ton or 10-cubic-yard heaped capacity. It is powered by a D Roadster Tournapull.

A New 9-Ton Hauler

A new rear-dump hauling unit, the E-9 Tournarocker, has been announced by R. G. LeTourneau, Inc., Peoria, Ill. Designed for loading by shovel, dragline, or backhoe, the Tournarocker is powered by the D Roadster Tournapull prime mover with the GM 4-71 engine.

The new model has a 9-ton or 10-cubic-yard heaped capacity. Its 7 x 11-foot top opening and 7-foot height are designed for easy spotting and loading. The load is centered down between the wheels for stability. Positive-power electric steering by a Tournatorque motor, plus a 90-degree left and right turning radius, provides maneuverability. Because it can turn around in a 14-foot 5-inch radius, the unit can operate in narrow cuts or sidehill jobs.

The Tournarocker dumps material behind its rear tires by raising the rocker body with a cable and sheave arrangement which is actuated by a Tournatorque electric motor. This arrangement enables dumping over the edge of fills. Forward speeds range from 2.77 to 25.27 mph; reverse speed 2.76 mph. The E-9 Tournarocker has multiple-disk air brakes on all four wheels and is mounted on 18.00 x 25 tapered-bead tires. The prime mover is interchangeable with the E-9 Carryall scraper and can also be equipped with snow plow and bulldozer blade.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 17.

Prefabricated Buildings

A 30-page catalog describing a wide variety of prefabricated steel buildings, their installation and applications, has been prepared by the Butler Mfg. Co., 7400 E. 13th St., Kansas City 3, Mo. It illustrates the uses these buildings can be put to and the different designs that can be obtained from standard units.

The seven basic designs, illustrated with cross-section drawings, include variations of rigid-frame, bowstring, and truss designs that provide building widths from 16 to 150 feet. Standardized construction permits a number of combinations, so that almost any total length, width, and final design may be achieved.

The catalog points out that rigid construction is obtained by bolts inserted through precision-punched holes for fastening. Deep-drawn 1⅛-inch corrugations spaced 12 inches apart provide panel strength. Also illustrated are doors, windows, ventilators, partitions, crane rails, gutter and down spouts, louvers, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 56.

F. H. McGraw in Canada

F. H. McGraw & Co., Engineers and Constructors, announces that its Canadian subsidiary, F. H. McGraw Co. of Canada, Ltd., established in 1940 and now operating from 1520 Mountain St., Montreal, is actively engaged in construction operations in Canada and is prepared to consult on any proposed projects in the Dominion.

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New Contractors' Pump Bulletin 8-CP-11 furnished on request.

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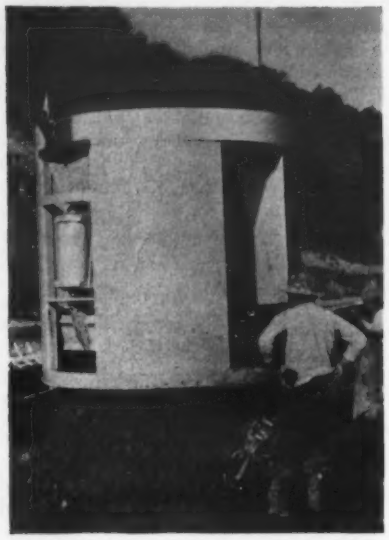

Positive control, quick opening and closing—these are features of the new Blaw-Knox Model CAC bucket for low-slump concrete.

New Bucket Handles Low-Slump Concrete

A new concrete bucket for handling low-slump concrete which contains large aggregates and air-entraining agents has just been announced by Blaw-Knox Co., 2067 Farmers Bank Bldg., Pittsburgh, Pa. An air-operated clam gate provides positive control and quick opening and closing of the circular Model CAC concrete bucket. Part of the load can be deposited in one location and the rest in another if desired.

Rectangular discharge openings on the new model are said to prevent the concrete from arching over the discharge throat. The transition from the circular hopper to the rectangular discharge throat produces hopper slopes that are 70 degrees with the horizontal, and corners that are practically vertical. The new buckets are furnished in 2, 3, 4, and 8-cubic-yard sizes. The 8-yard model can be supplied as a two-compartment or single-compartment bucket.

Further information may be secured from the company by requesting Bulletin 2331. Or use the Request Card at page 16. Circle No. 27.

Self-Dumping Wagon

A self-dumping wagon that can be pulled behind a truck, tractor, or Jeep hauling loads up to 5,000 pounds has been developed by Hotchkiss Steel Products, of Bradford, Ill. It has no hydraulic or power take-off mechanism. The tractive unit is simply backed against the telescoping tongue of the wagon and up go the thrust rods. The trussed frame pivots on the rear axle, dumping the load.

The Tri-Tralor has a three-point load distribution—a 70-inch wheelbase on the rear wheels and two side-by-side cambered front wheels. The front wheels are castered to give a full 360-degree turning radius. Channel cross-members on the trailer are adjustable in height and are designed to carry a standard flare-type box.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 61.

Road-Equipment Booklet

A new 20-page booklet describing the A-C tractor line has been released by the Tractor Division of Allis-Chalmers Mfg. Co., Box 512, Milwaukee, Wis. This illustrated catalog contains specifications and a brief description of Allis-Chalmers crawler tractors and wheel tractors, as well as motor graders and power units.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 115.

Jahn Co. Is Purchased

C. R. Jahn Co. of Savanna, Ill., maker of heavy-duty trailers, has been purchased by Pressed Steel Car Co., Inc., of Chicago. The manufacturing operations will be moved to Pressed Steel Car's Mount Vernon, Ill., plant, while the sales and executive offices will be at 6 N. Michigan Ave., Chicago.

The name of the Jahn organization has been changed to Jahn Trailer Division, Pressed Steel Car Co., Inc. C. R. Jahn, formerly President, will be Manager of Sales of the new division, and his son Herbert Jahn will remain in charge of trailer design.

Catalog on Steel Roof Deck

An 8-page folder of technical information on steel roof decks has been prepared by United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill. These decks are prefabricated interlocking units formed from sheets of copper-bearing steel; they are mill-painted and ready for erection.

The units are 18 inches wide with 1½-inch-deep ribs spaced 6 inches on centers. They are available in lengths up to 24 feet, in No. 18 or No. 20 gage steel. The catalog includes a complete description of the decks, their specifications, their functions and utility, and directions for installation where welding is to be used. Three full pages are devoted to detail installation drawings.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 2.

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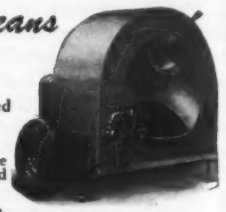

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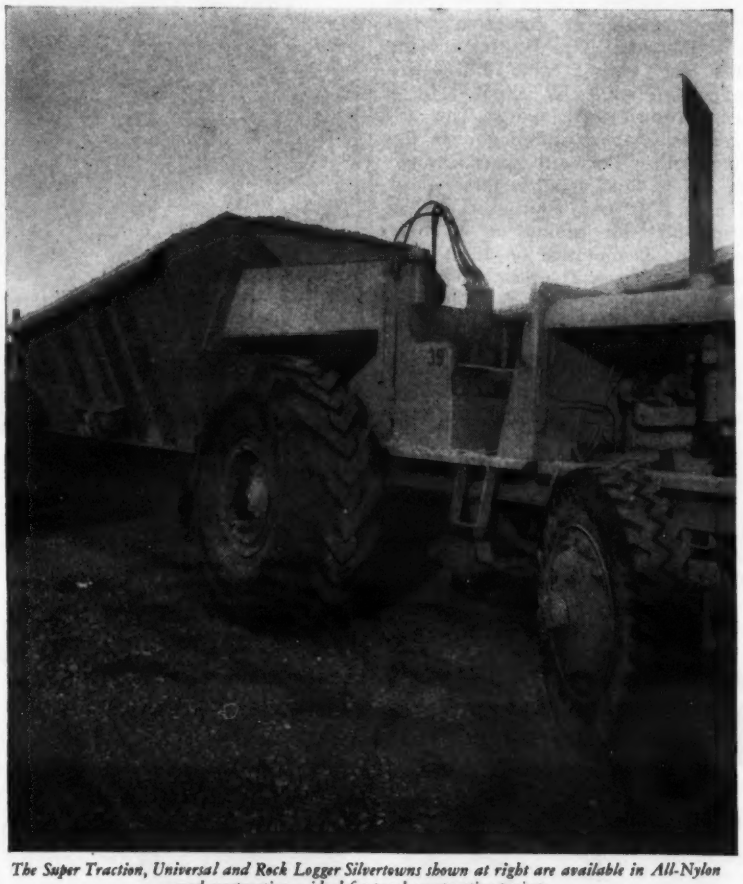

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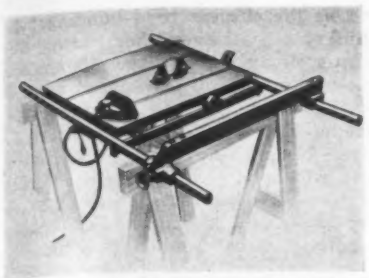

It takes 60 seconds to attach a portable Speedmatic saw to this new tilting saw table, says Porter-Cable Machine Co. The table weighs 44 pounds, so it's portable.

Portable Saw Table

A new tilting arbor saw table for Speedmatic portable saws has recently been announced by the Porter-Cable Machine Co., Syracuse, N. Y. Completely portable, the new table is designed to permit quick attachment of the portable saw by flipping back the hinged top.

The 26 x 20-inch table with 45-inch front and rear rail provides a maximum ripping capacity of 24½ inches. It may be mounted on saw horses anywhere on a building site, or on 32-inch steel legs available as accessories. The heavy-duty transparent plastic saw-blade guard is also an extra.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 97.

Replacement Pistons

Micro-X Vanasil pistons are now available as replacement pistons for 38 models of heavy-duty gasoline and diesel engines in trucks, tractors, and road-building machinery. These pistons, manufactured by Gillett & Eaton, Inc., 834 Doughty St., Lake City, Minn., are constructed of a vanadium silicon alloy designed for heavy-duty service.

This alloy, Vanasil, is said to be as light as any aluminum alloy, yet to have the low expansion characteristics of cast iron, which permits fitting Vanasil pistons to cast iron clearances, and use of solid skirt design. Its porous structure absorbs and holds a film of oil, says the company, thereby reducing piston and cylinder wear. The Vanasil alloy is also said to greatly reduce wear in top ring grooves and pin holes, thus maintaining engine efficiency and prolonging life of pistons.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 112.

Welding Transformer

A new 400-amp welding transformer made by A. O. Smith Corp., P.O. Box 584, Milwaukee 1, Wis., provides a welding range of 70 to 585 amps. The fan motor and capacitors of the 400E are easy to get at through the hinged door at the front of the machine. A heavy-duty motor and fan blade give high-speed air to clean and cool the coils. Commercially available secondary connectors are standard equipment. Other features include primary connections mounted in a standard knock-out box for simple installation, and a patented ball-bearing coil-moving screw designed for quiet operation and easy adjustment.

Further information may be secured from the company by requesting Bulletin No. W133. Or use the Request Card at page 16. Circle No. 23.

Report on Euclid Personnel

J. W. Bloomquist has been appointed Manager of the Hibbing, Minn., Branch of The Euclid Road Machinery Co., Cleveland, Ohio. He was formerly a Euclid district representative in the Minnesota territory, and for the past year has been Assistant Sales Manager at Cleveland. He succeeds the late J. R. Blackburn in the Minnesota post.

Other personnel changes include the appointment of W. F. Early as District Manager in New England and K. F. Hamilton as district representative in Oklahoma. H. P. Behl is now a district representative in northeastern California and most of Nevada.

Steam Power Supply

The 1950 Steam-Pak generators have been redesigned by York-Shipley, Inc., 54 Jessop Place, York, Pa. These new models are available for high and low steam pressure, 15 to 150 hp for gas, oil, or combination gas and oil.

A patented feature provides precision control of burner air by properly metering to match the firing rate, and accurately synchronizing air-oil adjustment. A new linkage assembly gives independent adjustment of either blower air or fuel. Manual adjustment of the rate of lubrication for the atomizing air compressor has been eliminated by a new method of lubrication. Electronic-type combustion safety controls are standard.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 100.

Electric Generating Sets

A 4-page folder describing the various uses for independent electric generating sets has been prepared by the Universal Motor Co., 428 Universal Drive, Oshkosh, Wis. The models illustrated and described in the folder, Form No. BE1, are both gasoline and diesel-powered and have capacities ranging from 250 watts to 35 kilowatts. Both water-cooled and air-cooled models are presented. The general specifications of 20 basic models are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 42.

Tilting-Top Trailers

A circular describing two tilt-top trailers for transporting construction equipment has been prepared by Arthur Rehberger & Son, Inc., 320 Ferry St., Newark 5, N. J. It gives illustrations and complete specifications for three drawbar types with capacities of 14,000, 24,000, and 30,000 pounds; and two semi-drop frame models with capacities of 30,000 and 40,000 pounds. This literature points out that the drawbar types are hydraulically hand-operated, whereas the semi-drop frame types are hydraulically power-operated. The latter models have the pump mounted on the towing unit.

This literature may be obtained from the company or by using the Request Card at page 16. Circle No. 88.

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Concrete
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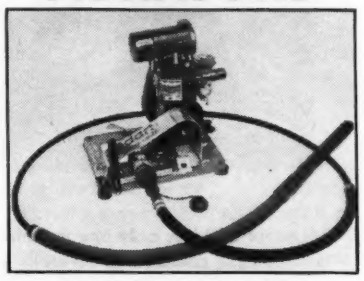

The "Dyna-Mite"—Model 180 P

Contractors find the new Dart "Dyna-Mite" with either the 1-5/8" or 1-1/8" L-10 head ideal for placement in tight form work such as casing I-beams. Small, light in weight, but highly efficient (7200 R.P.M.) on small jobs where larger Dart models are not necessary. Equipped with automatic clutch for easy starting.

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New Hampshire Pike Is Built in Fast Time

(*Continued from page 1*)

bridges, totaled $5,251,024.

At the south end, Massachusetts will construct an extension, about 10,000 feet long, to tie the New Hampshire toll road in to the Newburyport Turnpike or U. S. 1. Going north the new highway is on new location, lying west of both U. S. 1 and the Boston & Maine railroad. At the north end it swings back to connect with U. S. 1 through a rotary traffic circle at the south end of the Portsmouth, N. H., by-pass. The route is strictly limited access, with only one interchange provided about 5 miles from the south end near Hampton. At this point the toll houses will operate.

Two 24-Foot Macadam Pavements

The New Hampshire Turnpike runs through a 300-foot strip of right-of-way that roughly parallels U. S. 1 about 1½ miles to the west of that 3-lane hazardous and heavily traveled highway. For the first few miles the topography is moderately flat at the south end, but becomes more rolling toward the north where the heaviest excavation was encountered. About 85 per cent of the route was wooded. Of the 1,111,600 cubic yards of unclassified excavation in the engineers' estimate, about 200,000 yards turned out to be ledge rock, with the remainder composed mostly of sand and glacial till. A separate item of 92,000 yards of muck excavation covered the removal of some extensive peat deposits from swampy areas.

Not enough material was provided by the roadway excavation to complete the embankments—the project is about 75 per cent fill averaging 5 to 6 feet in height. Nearly 1,000,000 yards of borrow was obtained from 8 pits just off the right-of-way, requiring an average haul of around 2,000 feet. The Turnpike has a gravel foundation course 18 inches thick in fills and from 24 to 36 inches in the cuts; the greater depth is used in poor subsoil. This foundation gravel in full depth extends one foot beyond the stone base course, and continues with a 12-inch thickness out under the shoulders.

The dual crushed-stone base courses are 4 inches thick and 26 feet wide, supporting 24-foot bituminous-macadam pavements 3 inches thick. The roadways are separated by a median strip that measures 24 feet between edges of pavement. The pavements have a 3-inch center crown, and are flanked along the outside by 11-foot shoulders having an 18 to 1 slope. The latter slope is also maintained on the inner or median side over a 4-foot shoulder, and continued toward the center to form a depressed section 8 to 14 inches below the center-line grade. While the shoulders are gravel, the median has a 6-inch loam center.

C. & E. M. Photo
An Adnun Black Top Paver lays base-course stone on the Turnpike. A Mack truck with a Heil body delivers 18 to 20 tons of stone per load to the paver.

Nearly 500 catch basins are spotted throughout the depressed median to handle the drainage which is carried along to outlets in the embankment sections. A large amount of 6-inch bituminous-coated perforated corrugated-metal pipe was placed in the shoulders to intercept ground water. The cuts were drained with large-size reinforced-concrete pipes which were outletted when fill sections were reached.

Punching the Hole

As a start in the construction operations, clearing in the right-of-way was done primarily with power saws—3 Malls and 2 Homelites. All wood was salvaged for the original property owners. The entire strip was not cleared, only back to a line 10 feet beyond the toe and top of slope in fills and cuts respectively. Such restraint in cutting spared many beautiful trees along the roadway, and preserved as much as possible the natural appearance of the woods.

The contractor elected to work from the north end south, since he was buying all the crushed stone for base course and pavement from John Iafolla Stone Products Co. whose quarry and crusher are located on Beverly Hill Road just south of Portsmouth. He early decided to haul this stone over the Turnpike as it was graded, rather than use crowded U. S. 1. Hence all grading efforts were concentrated to punch a hole through from the north to the south over the entire project, and get some kind of haul road in working order as soon as possible. The full width of roadway was not graded as the earth work advanced, but was widened gradually over the months. The fills too were built up little by little. In this way grading was going on in several places at the same time, and equipment was shifted about as needed over that vital haul road extending from one end of the job to the other.

With the work thus spread out, the Savin Construction Co. marshalled an imposing array of earth-moving equipment to handle the job. Quite as amazing as the efficient road-building machinery was the weather during the winter of 1948-1949. New Hampshire experienced one of the mildest winters of record, so that the contractor did not have to shut down the project because of the heavy snows and severe cold weather which are normal to this part of New England. Instead, but one day was lost all winter—a favorable condition on which no one counted.

Rock and Muck

Two opposite extremes, rock and muck, were encountered in the roadway excavation. Most of the rock occurred in two ledge cuts of 47,000 and 60,000 yards respectively. These cuts, 25 to 28 feet deep, were drilled chiefly with an Ingersoll-Rand Quarry Master which made 5½-inch-diameter holes at the rate of 10 to 12 feet an hour. The holes were spaced about 15 feet on centers both ways, and the average 30-foot hole drilled in these cuts was charged with 200 pounds of 60 per cent dynamite. Hercules explosives were employed. The smaller ledge cuts were drilled with a battery of 12 wagon drills

(*Continued on next page*)

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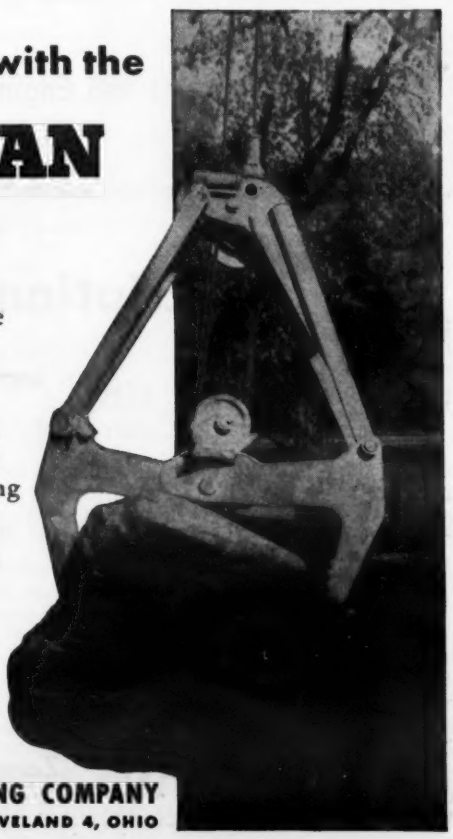

- Simplifies handling of large stone. Operates like multiple rope clamshell bucket with opening and closing of jaws controlled from cab of crane. Four-part closing cable reeving develops tremendous closing force on stone. Model shown has 5-ton capacity, 4′-6″ jaw spread, weighs 2200 lbs. Other capacities available. Write for details.

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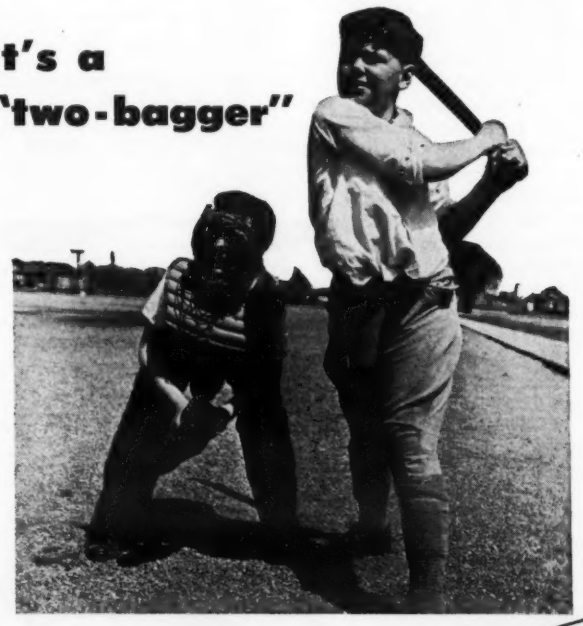

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CONSTRUCTION MACHINERY CO. Waterloo, Iowa	THE KNICKERBOCKER CO. Jackson, Mich.	THE T. L. SMITH COMPANY Milwaukee, Wis.
THE FOOTE CO., INC. Nunda, N. Y.	KOEHRING COMPANY Milwaukee, Wis.	WORTHINGTON PUMP & MACHINERY CORP. Ransome Division, Dunellen, N. J.

C. & E. M. Photo
An Etnyre 3,500-gallon distributor on a Mack truck shoots asphalt on the surface stone course of the Turnpike. The other Etnyre at right is mounted on a Brockway.

C. & E. M. Photo
Cover stone on the Pike is swept by a broom drag pulled by an Oliver rubber-tired tractor, and rolled by a Buffalo-Springfield 3-axle tandem roller.

—Ingersoll-Rand and Worthingtons—powered by the same makes of compressors together with Gardner-Denver and Chicago Pneumatic units. A dozen compressors were on the job in either 315-cfm or 500-cfm sizes.

In places, the deposits of muck, mostly sea marsh or peat, stretched out in sections 600 to 1,200 feet long. Most of them were fairly shallow, 8 to 10 feet deep, and were removed entirely from the roadbed. In two areas, however, the muck was 50 feet in depth. At these locations, a crust or mat that had formed over the swamp was broken up with dynamite, and then fill from borrow pits was brought in and placed on top. The material was built up in a surcharge in these areas to a height of 7 feet above the finished grade. The heavy load compressed the softer material underneath in order to attain full settlement.

Excavating equipment included at one time three 80-D Northwest 2½-yard shovels; a No. 6 Northwest 1½-yard shovel; a Bucyrus-Erie 2½-yard shovel; two 820 Thew-Lorain 2-yard shovels; one Lorain ½-yard and two Northwest ¾-yard backhoes; two P&H truck cranes; two 820 Lorain 2-yard cranes; and a TL 20 Lorain truck crane. Hauling equipment included nineteen 15-yard bottom-dump Euclids; nine end-dump 10-yard Euclids; twelve 14-yard Tournatrailers; and three LeTourneau 30-yard buggies drawn by Allis-Chalmers tractors, either HD-19's or HD-14C's. The big rubber-tired buggies were also used in road clean-up operations; cranes loaded them with stumps and brush. The bottom-dump Euclids and Tournatrailers hauled rock, as did two Athey wagons pulled by A-C tractors.

Dirt Work

The remainder and bulk of the earth work was either sand, gravel, glacial till, or a combination of all three, occurring both in the roadbed and in the borrow pits. This material handled easily during the unusually dry winter. Good progress was made in the borrow pits with a Euclid loader which filled a bottom-dump wagon with 15 yards of material in 40 seconds. Also engaged in dirt-moving were eight Tournapulls carrying 12-yard loads, an 18-yard Heiliner, a self-powered LaPlant-Choate scraper, and a Caterpillar scraper hooked to an HD-19 tractor.

Roadbed fills were built up in 12-inch lifts, compacted and spread by dozers, and shaped by motor graders. Tractor equipment included 14 Caterpillar D8's, an International TD-24 and TD-18, the Allis-Chalmers units already mentioned, and a rubber-tired Tournadozer. Among the graders were two Caterpillar No. 12's, a Galion, and an Austin-Western 99-M. Working a single 10-hour shift for five days a week, the contractor moved from 10,000 to 15,000 yards a day. At the peak of operations the total number of employees was around 375.

In addition to the material taken from the borrow pits, practically every bit of dirt excavated on the right-of-way was used in the roadbed. Ordinarily, in fills up to 10 feet the side slopes are 4 to 1; over 10 feet the slopes are 2 to 1. But these slopes were flattened out as much as possible in the interest of safety and maintenance to 6 to 1. Much of the muck was employed for this purpose. Slope flattening was also done in cut sections. Specifications called for a 4 to 1 drop for 4 feet from the outside edge of the shoulders to the ditch, then a 1½ to 1 backslope in earth, and a 1 to 2 backslope in rock. Most of the earth cuts are flattened to 3 to 1, and in some cases 6 to 1 or even 8 to 1. The earth cuts are fairly shallow, however, the biggest cut being 12 to 15 feet deep and 4,000 feet long in sand and gravel material.

Grades are flat, mostly under 1 per cent, except for one short stretch of a 3 per cent grade where the Turnpike climbs an approach fill leading to a bridge over a railroad. Only three 1-degree curves are in the horizontal alignment, and this is the maximum curve permitted except at the north-end rotary which has an inside diameter of 400 feet.

Structures

Work on the 17 major structures was also carried on during the grading operations. The Turnpike passes under 14 of these structures which carry cross road traffic. It crosses over Taylor River, Hampton Falls River, and the tracks of the B. & M. Railroad. The Hampton Falls River structure is merely a large concrete box culvert; the Taylor River structure is also a box culvert having walls of steel sheet piling, topped by a concrete roof slab. The railroad crossing consists of two bridges, designed for H-20 S-16-44 loading, each having a 36-foot deck to carry a 24-foot roadway flanked by a 10-foot shoulder on one side, and a 2-foot shoulder on the other. Each structure has concrete abutments and two steel bents, with a steel H-beam foundation.

The other highway grade-elimination structures are neat, mostly similar, of simple and economical design with concrete abutments and a single center pier of either three or four concrete columns. All are founded on stable soil except one where timber piling was used. The superstructure is made up of steel beams carrying an 8-inch concrete deck.

For the concrete work a batch plant was set up near the contractor's office and shop about midway of the job. A Blaw-Knox 75-ton aggregate bin was charged with sand and stone by a Lima ¾-yard clamshell crane. Sand was furnished by the Manchester Sand & Gravel Co. of Manchester, N. H., and stone by the John Iafolla quarry at Portsmouth, N. H. North American bulk cement came from Alson, N. Y., and was stored in a B-K 150-barrel cement bin. Reinforcing steel was supplied by the Bancroft & Martin rolling mills of Portland, Maine, while the structural steel came from the Bethlehem, Pa., plant of the Bethlehem Steel Co.

Six batch trucks carried the cement and aggregate to three 34-E pavers—two dual-drum Ransomes and a Multi-Foote single-drum—where the concrete was mixed. Water came from a spring right on the Turnpike not far from the batch plant, with three 3,000-gallon tank trucks serving the pavers.

Forms for the piers and abutments were made up in 8 and 10-foot panels of ⅝-inch plywood backed with 4 x 6 studs and 4 x 6 wales, both on approxi-

(*Continued on next page*)

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Model 1—6 hp., 6000-7500 rpm
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Complete unit consists of engine mounted on wheelbarrow chassis, 21 feet of flexible shafting (three 7-foot sections) and vibrator head 2"x22", 2½"x16" or 3"x16". *Write for circular.*

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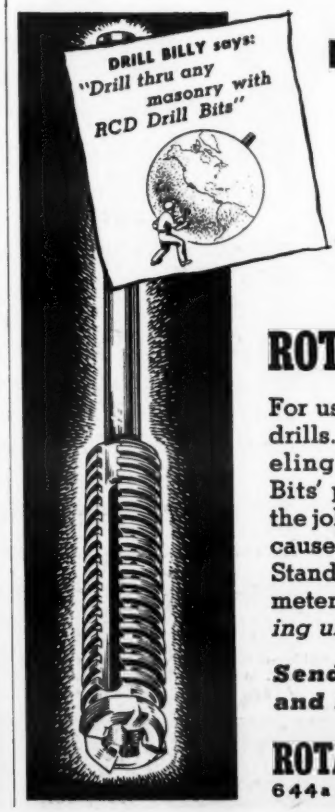
The following equipment is optional and extra. Hydraulic tilt control, two speed winch, electric brakes.

Built for tough service, the tilting platform of the Model "B" provides easy handling of loads up to 10 tons. The all steel frame has tapered channels 12" deep brazed from corner to corner with 3" channels. The Miller straight through axle is integral with the frame and features 3⅜" dia. solid steel, stub inserts. Dual Budd wheels and hubs, tires, platform, Timken bearings and pintle eye are all standard equipment.

RAY MILLER RESEARCH ENGINEERS DEPT. 370, 727 W. BURNHAM ST. MILWAUKEE 4, WIS.



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New Hampshire Pike Is Built in Fast Time

(*Continued from preceding page*)

mately 4-foot centers. They were held together with Richmond ties. Cranes and buckets placed the concrete in the forms. For the numerous culvert headwalls, the concrete was mixed and placed with a pair of Rex truck-mixers mounted on Macks.

Macadam Pavement

Over 500,000 yards of gravel were required for the base course. This material came from six pits off the right-of-way, where it was loaded out by shovels into the rubber-tired self-powered equipment. The maximum haul was 3 miles. On the road it was placed in 6-inch lifts, and compacted by the hauling and spreading equipment. Before the base-course stone was laid, the gravel sub-base was scarified to a 3 to 4-inch depth where it had become rutted from the heavy hauling. The roadbed was then reshaped by the graders and compacted by steel-wheel rollers. The rollers were Buffalo-Springfield—two 3-wheel tandems at 14 to 18 tons, and two 2-wheel tandems at 20 tons.

From the John Iafolla quarry at Portsmouth, which crushed 2,000 to 3,000 tons of stone a day for the job, a fleet of the contractor's trucks hauled the material—over 200,000 tons of it. Dead haul to the north end of the job was about 2½ miles. The trucks on the stone haul included six 10-wheel Macks holding 18 to 20 tons; three semi-trailers—two Macks and a Sterling; and four 5-yard Sterlings carrying chip stone. For the base course, 2-inch stone was used, and this was laid by an Adnun Black Top Paver in a single 4-inch lift in two 13-foot lanes for each roadway.

The base was rolled with four passes of the heavy tandem rollers to get a definite keying action, and then given a penetrating shot of AC asphalt, 85 to 100 penetration, at the rate of 1.5 gallons to the square yard. Esso asphalt was supplied and applied by the Trimount Bituminous Products Co. of Everett, Mass. It was delivered to the job after a 45-mile haul, or 2-hour run, by two transport trucks from Everett. On the road it was applied at 300 to 365-degree temperatures by a pair of Etnyre 3,500-gallon distributors—one mounted on a Mack and the other on a Brockway. They operated in adjacent lanes, one behind the other, with a strip of paper laid across the road at the start of each shot to prevent an excess of bitumen at that point.

After this application, the base stone was given a couple of passes with the 3-axle rollers, and then chinked with ½-inch stone from a Buckeye spreader box at the rate of 30 pounds to the square yard. After this was rolled in, a 3-inch surface course, made up of 2-inch stone, was laid in a single layer by the Adnun machine. After rolling, it was penetrated with 2 gallons to the square yard of 85-100 AC asphalt from the distributors, and chinked with ¾-inch stone. The latter was applied by the Buckeye spreader at the rate of 28 pounds to the square yard, and worked in to the larger stone beneath with a broom drag pulled by an Oliver rubber-tire tractor. The broom consisted of a wooden frame mounted on four rubber tires and carrying 5 rows of steel bristles. Following the brooming, the surface course was rolled by the 3-axle tandem rollers.

C. & E. M. Photo

Typical of all the Turnpike structures is this Brumble Hill Road bridge. Here steel is erected and forms are being built for the concrete deck pour.

Next the surface course was given a shot of 85-100 AC asphalt at the rate of 0.6 gallon to the square yard, and covered with ½-inch peastone, 26 pounds to the square yard. The final seal consisted of 0.3 gallon to the square yard of RC-5 asphalt, followed by a cover of ⅛-inch peastone, 25 pounds to the square yard.

Other Work

Some concrete pavement was also laid on the Turnpike—at the rotary traffic circle on the north end, and around the toll houses at the interchange structure. Granite curbing at such locations was supplied by the Fletcher Granite Quarries of Chelmsford, Mass. While grading and paving on the Turnpike itself were completed by the end of 1949, most of the other miscellaneous work was finished early in 1950.

To keep the large fleet of equipment in good condition, the contractor built a 45 x 120-foot shop-garage—a frame building lined with tar paper, with steel roof trusses and a concrete foundation floor. It was heated by a Dravo garage heater, and was equipped with overhead hoists, lathes, drill presses, and the necessary small tools. Two Rogers trailers, a 100-ton and a 50-ton, hooked to a Mack and Sterling truck respectively, shifted the large equipment about as needed.

Equipment was serviced in the field by three Lincoln greasing units mounted on International trucks, and fueled with Esso products from a 1,500-gallon tank truck.

(*Concluded on next page*)

WODACK "DO-ALL"

THE MOST USEFUL ELECTRIC HAMMER MADE IN COMBINATION WITH AN ELECTRIC DRILL

UNEQUALED AS TIME AND LABOR SAVER

It's an electric hammer for concrete ● *It's an electric drill for wood and metals.*

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the NEWSpaper of highway and heavy construction

Quantities and Personnel

The major items in the 15-mile Turnpike contract included the following:

Clearing and grubbing	239 acs.
Explosives for muck removal	5,000 lbs.
Unclassified excavation	1,111,600 cu. yds.
Muck excavation	92,000 cu. yds.
Unclassified trench excavation	47,000 cu. yds.
Unclassified structures excavation	10,500 cu. yds.
Earth borrow	982,900 cu. yds.
Gravel borrow, base course	536,600 cu. yds.
Class A bituminous surface treatment	110,400 gals.
Crushed stone, base course	119,400 tons
Crushed stone, surface course	85,000 tons
Bitumen	1,696,000 gals.
Concrete, structures	13,075 cu. yds.
Reinforcing steel	1,259,500 lbs.
Structural steel	1,805,000 lbs.
RC pipe, 12 to 60-inch	26,340 lin. ft.
Corrugated-metal pipe, 6-inch	26,140 lin. ft.
Granite curb	27,200 lin. ft.
Cable guardrail	27,190 lin. ft.
Stock wire fence, right-of-way	155,000 lin. ft.
Loam, 4-inch thick	291,000 sq. yds.
Fertilizer for grasses	78,200 lbs.

For the Savin Construction Co. of East Hartford, Conn., L. F. McCarthy was Project Manager, B. A. Wilder was General Superintendent. H. C. Savin was Assistant Superintendent, and R. L. Staples was Engineer.

The New York consulting engineering firm of Parsons, Brinckerhoff, Hall & Macdonald, which designed the New Hampshire Turnpike and supervised its construction, was represented on the project by John O. Morton, who has subsequently become Chief Engineer of the New Hampshire State Highway Department; E. J. Davis, Resident Engineer; F. C. Sturm, Bridge Engineer; and C. D. Prince, Senior Inspector. Major General Frank D. Merrill is Commissioner of the New Hampshire State Highway Department.

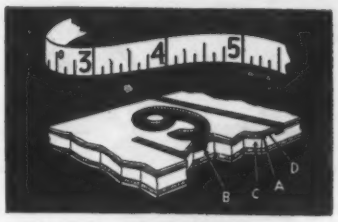
C. & E. M. Photo

Project Manager on the Turnpike for Savin Construction Co. was L. F. McCarthy, left. John O. Morton, who represented Parsons, Brinckerhoff, Hall & Macdonald on the project, is now Chief Engineer of the New Hampshire Highway Department.

Catalog on Scaffolding

A new 2-color catalog illustrating a complete line of tubular steel scaffolding and equipment has recently been issued by Bil-Jax, Inc., Archbold, Ohio. Included in the 8-page folder are drawings and complete specifications on various types of end frames for tower scaffolding, and a broad range of accessories including ladders, ladder jacks, scaffold brackets, sidewalk bridges, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 33.



The DurRoe measuring tape has a steel base (c), coated with white nickel (a) plate. Permanent black markings (b) are etched into the steel, and the whole is overlaid with a clear plastic protective coat (d).

White Measuring Tape

A white tape with permanent markings etched in is manufactured by Justus Roe & Sons, Roe Court, Patchogue, N. Y. This new DurRoe tape has a steel base coated with a white nickel plate background for luster, contrast, and protection. The permanent black markings are etched into the steel, and the whole is overlaid with a clear plastic coat for added wear resistance and durability.

The company also markets a standard etched steel tape that has a black background with raised markings, and a white-on-black tape. Both of these have plastic overcoatings. All tapes are available in 25, 50, 75, and 100-foot lengths. Leather, leatherette, and steel cases are offered.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 59.

Wood Preservers Meet

The 46th Annual Meeting of the American Wood Preservers' Association was held in the Rice Hotel, Houston, Texas, April 25-27. It was one of the largest conventions in the history of the association; more than 500 officials of the wood-preserving industry, engineers, lumbermen, and railroad and utility men attended.

A long-term test was announced at the meeting, to determine whether the varied chemical analyses of accepted creosotes have any effect on their wood-preserving value. Another test reported by J. O. Blew and W. L. Olson, technologists of the Forest Products Laboratory, indicates that pressure treatment by standard wood preservatives has no adverse effect on the durability of plywood bonds.

Fred W. Gottschalk, Technical Director of the American Lumber & Treating Co., was elected President of the association, succeeding J. S. Giddings of the Santa Fe Railway.

Smith Expands in East

Last month in Tipp City, Ohio, construction began on a new 60,000-square-foot factory for A. O. Smith Corp. Production of single-phase and polyphase motors at the plant is expected to be under way in September. Smith recently bought Whirl-A-Way Motors, Inc., in Tipp City, and the Tipp City operation now becomes the Eastern Motor Division of A. O. Smith, with D. L. Mills, former President of Whirl-A-Way, as Manager. Eastern sales and administrative offices of Smith will be located at Dayton, Ohio, with Mr. Mills in charge.

Four Major Facts about C&E Monthly

1. It carries more editorial material than any other monthly publication in the field.
2. It also carries a higher proportion of editorial to advertising content.
3. C&E Monthly carries more display advertisers than any other monthly, and,
4. More *exclusive* advertisers.

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The Big Beam Junior hand lamp operates on one standard lantern battery.

Portable Hand Lamp

A new portable electric hand lamp is available from U-C Lite Mfg. Co., 1050 W. Hubbard St., Chicago 22, Ill. Powered by one standard 6-volt lantern battery, the Big Beam Junior Model No. 111 has lamp-to-battery contacts that are of the pressure type, said to permit battery replacement in 10 seconds. A combination of 4-inch lamphead, parabolic reflector, bulb, and heavy glass convex lens gives a powerful spot or spread light. Lamphead and handle are chrome-finished. The battery case with its hinged cover made of 20-gage steel is weatherproof and rustproof, the manufacturer says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 49.

Ball-Bearing Swivels

A strengthened and more complete line of Miller swivels for eliminating wire-line twist and kinking has been announced by General Machine & Welding Works, 1100 E. Second St., Pomona, Calif. It offers fifteen different types of end connections and nine swivel capacities ranging from the AA Model rated at a 250-pound working load to the H Model at 46,200-pound working load. All swivels have a safety factor of 5 to 1, the company says.

These ball-bearing angular-thrust swivels are designed for lifting concrete buckets, demolition balls, and other types of single-line hoisting. They may also be used in connection with traveling blocks. The swivels turn freely under stress, removing all the kink and twist usually present when a wire line is heavily loaded, says the manufacturer; they thereby eliminate spinning of the load and increase operator control and wire-line life.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 135.

The Variable Scale in Use

A broadside on the application and construction of the new Gerber Variable Scale has been issued by Gerber Scientific Instrument Co., 89 Spruce St., Hartford 1, Conn. The scale embodies features of a slide rule, scale, or proportional divider, and may be used on technical and non-technical problems which involve interpolation, spacing, scaling, proportions, graphical-algebraic calculations, odd scales, plotting, etc.

The 8 sample applications described in the literature indicate the problem and the method of solution with the scale. A large size photograph illustrates the scale and points out salient features of its construction.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 99.

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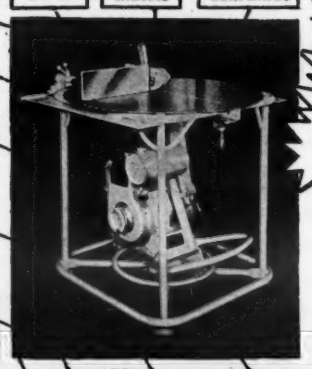

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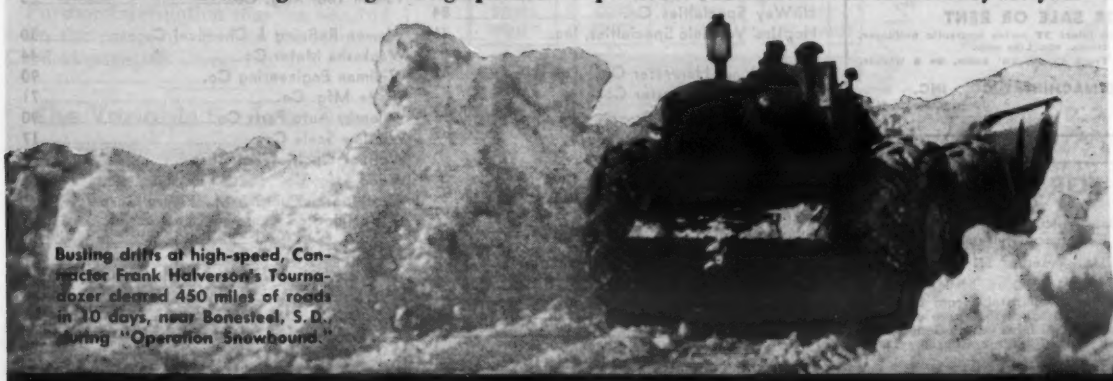

Busting drifts at high-speed, Contractor Frank Halverson's Tournadozer cleared 450 miles of roads in 10 days, near Bonesteel, S.D. during "Operation Snowhound."

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